A MONOGRAPH OF THE PHEASANTS

BY

WILLIAM BEEBE

VOLUME II.

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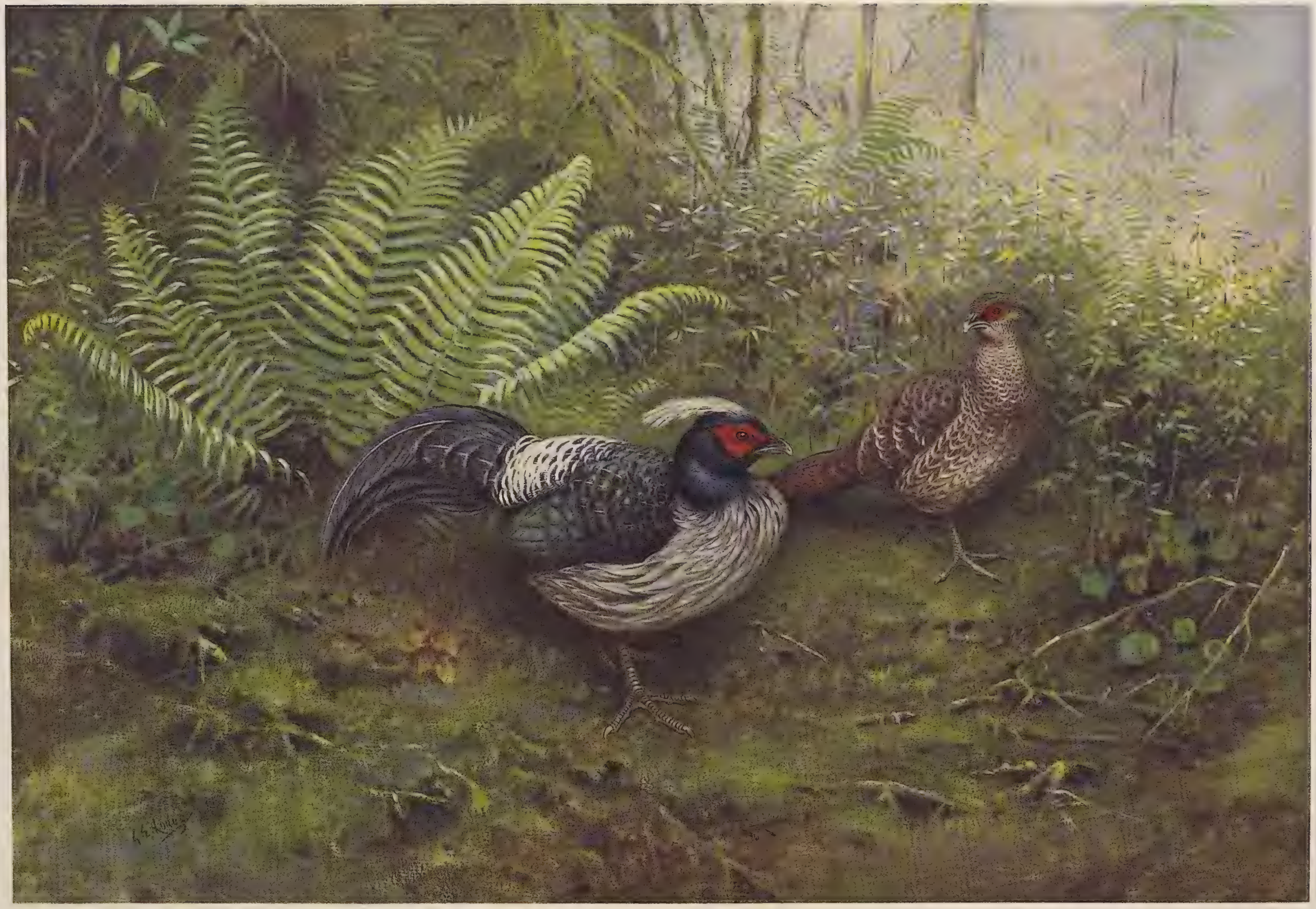
A MONOGRAPH OF THE PHEASANTS

FRONTISPIECE, PLATE XXI.



WHITE-CRESTED KALEEGE.

WHITE-CRESTED KALEEGE

Gennaeus albocristatus (Vigors)

Over the great spruce forests of Kashmir and Garhwal chilly winds come roaring down from Tibetan snow-peaks. But among the ferns and moss-muffled bases of the trees the air is still, and fragrant with the odours of many forest flowers. Here the White-crested Kaleege live; here they scratch for grubs and tubers, court their mates, make their lowly homes, and at twilight roost upon high, swaying branches. Before dawn a few will succumb to the sudden attack of marten or weasel; the others awaken in early morning, send forth their challenge and begin anew their daily life.

A MONOGRAPH OF THE PHEASANTS

BY

WILLIAM BEEBE

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LIST OF COLOURED PLATES, PHOTOGRAVURES AND MAPS

COLOURED PLATES

Plate XXI. WHITE-CRESTED KALEEGE *Gennaeus albocristatus* (Vigors)
Painted by G. E. Lodge. *Frontispiece*

Over the great spruce forests of Kashmir and Garwhal chilly winds come roaring down from Tibetan snow-peaks. But among the ferns and moss-muffled bases of the trees the air is still, and fragrant with the odours of many forest flowers. Here the White-crested Kaleege live; here they scratch for grubs and tubers, court their mates, make their lowly homes, and at twilight roost upon high, swaying branches. Before dawn, a few will succumb to the sudden attack of marten or weasel; the others awaken in early morning, send forth their challenge and begin anew their daily life.

Plate XXII. NEPAL KALEEGE *Gennaeus leucomelanus* (Latham) . *Facing page* 26
Painted by G. E. Lodge.

No white man has ever seen this bird in its native haunts, for it is confined to the southern part of Nepal, where no Caucasian is admitted. It lives in the moss-hung oak and spruce forests which cover the maze of tumbled mountain ranges of this little kingdom, and is trapped wholesale by the Nepalese shepherds.

Plate XXIII. BLACK-BACKED KALEEGE *Gennaeus melanonotus* (Blyth)
Painted by G. E. Lodge. *Facing page* 30

Deep in the mossy, humid forests of Sikhim I have watched a pair of these pheasants picking among the fallen leaves, and murmuring to each other in low musical tones. Later the hen made her way to her nest among the ferns at the base of a great tree, and the cock mounted slowly, branch by branch, to a lofty perch, and night settled quietly down over the Himalayan wilderness.

Plate XXIV. PLUMAGES OF THE BLACK-BACKED KALEEGE *Gennaeus melanonotus* (Blyth) . . . . *Facing page* 40
Drawn by H. Grönvold.

Even when young Black-backed Kaleege have moulted late, the shape, pattern and colour of the adult plumage are not fully attained until after the first year.

Fig. 1. Chick in down four days old, collected in Sikhim, May 20th.

Fig. 2. The sexes are clearly distinguishable in the juvenile plumage, the female showing much warmer, more buffy tones, especially on the head, back and tail. In this individual, the down is still present on the face, concealing the reddish skin beneath.

Fig. 3. The juvenile male is darker throughout, with narrower white tips to the feathers. The incoming dark, central tail-feathers are not clear black, but coarsely vermiculated with grey.

Plate XXV. BLACK-BREASTED KALEEGE *Gennaeus horsfieldi* (Gray)
Painted by G. E. Lodge. *Facing page* 42

Among the moss-hung forests and the bamboo thickets of north-eastern Burma, I first heard the bubbling murmur and cackle of this pheasant. In pairs or in small flocks they work slowly through the ferns and over fallen logs, their scarlet facial skin glowing like the ginger blossoms beneath their feet. A grouse-like whirr of their wings, or the sound of scratching among dry leaves would often indicate their presence, but they were always on the alert, watching and listening for danger with keen eyes and ears.

PLATE XXVI. LINEATED KALEEGE *Gennaeus lineatus* (Vigors) . *Facing page* 52

Painted by G. E. Lodge.

A night spent in slumber on the branch of a tree; an early morning drink and search for food; a midday siesta; again a feeding period and in the cool of early evening a leisurely stroll to water and thence to roost; such is the epitome of the daily life of the Lineated, as well as of most other pheasants.

They can be located often by the sound of their scratching among leaves, or the low, undertone clucks and chuckles as they search for grubs or succulent tubers.

PLATE XXVII. CHINESE SILVER KALEEGE *Gennaeus nycthemerus* (Linnaeus)

Painted by C. R. Knight. *Facing page* 62

This, the beautiful bird of "day and night," ranges across the whole of south China, from the Burmese border almost to the sea-coast of Fokien. It is found in open forest, on clear, rolling hills and along swift rivers. While the Silver Kaleege is common in captivity, yet no white man has ever seen the nest and eggs of a wild bird. Enormous numbers were formerly killed for their plumage, but now the Chinese have developed a taste for their flesh and trap and shoot the bird extensively.

PLATE XXVIII. HAINAN SILVER KALEEGE *Gennaeus whiteheadi* Grant

Painted by G. E. Lodge. *Facing page* 72

This bird is very close to the Silver Kaleege, but as it is found only on an island off the south China coast, it must be recognised as a distinct species. There is less white on the outer tail-feathers than in the silver bird, while the female is actually more like the corresponding sex in the Lineated than in the Silver Kaleege. Mr. Whitehead, who obtained the first specimens, died before he left the country, and since that time only Japanese collectors have taken the bird.

PLATE XXIX. EDWARD'S KALEEGE *Gennaeus edwardsi* Oustalet . *Facing page* 76

Painted by G. E. Lodge.

Although known for a quarter of a century, absolutely nothing has been recorded of the habits of this very distinct and beautiful pheasant. Four specimens have been obtained from the province of Kaung-tri in Annam.

PLATE XXX. SWINHOE'S KALEEGE *Gennaeus swinhoii* (Gould) . *Facing page* 78

Painted by G. E. Lodge.

In the deep inland forests of the mountains of Formosa this splendid bird makes its home. None but the natives have observed or captured it, and there is no record of the nest and eggs being found, but the bird lays readily in captivity and is not rare in zoological gardens.

PLATE XXXI. RIPPON'S HYBRID SILVER KALEEGE . . . *Facing page* 92

Painted by G. E. Lodge.

This bird has been given a name (*Gennaeus ripponi*), but no two birds are alike, and there is no doubt but that it represents individuals which have a very large percentage of the blood of the Silver Kaleege, with a relatively small amount of Black-breasted ancestry. I found a typical bird in a flock of eleven in northern Burma. They showed great variation, and could not be classified with any specific exactness, and only one approached the description of this hybrid form.

PLATE XXXII. OATES'S HYBRID KALEEGE . . . . . *Facing page* 94

Painted by G. E. Lodge.

This bird, which some ornithologists have considered to be a species (*Gennaeus oatesi*), shows great variation in the dozen skins I have examined. We must either give a half-dozen new names to them or consider them as hybrids. Oates's Kaleege represents birds with the blood both of the Black-breasted and Lineated Kaleege, but the latter greatly dominant.

Plate XXXIII. MALAYAN CRESTLESS FIREBACK *Acomus erythrophthalmus* (Raffles) . . . . *Facing page* 102

Painted by G. E. Lodge.

These birds are exceedingly pugnacious, and I have even seen hens fighting madly with each other. Both sexes are armed with spurs. They live along the small creeks which wind through the low jungle, and haunt the water-holes of the buffalo. The sound of warning or challenge, uttered when two cocks threaten one another, is a deep, hoarse drawl, almost a snarl, sounding as much like a small cat as a pheasant.

Plate XXXIV. BORNEAN CRESTLESS FIREBACK *Acomus pyronotus* (Gray)

Painted by G. E. Lodge. *Facing page* 108

Low, wet jungle along the coast of Borneo is the home of this bird. I have seen a pair feeding beneath a berry tree, upon the fallen fruit, together with the insects which have collected. A small bird called out in alarm at the sight of some danger, and both birds squatted flat among the begonias. A scale-bird sang, and confidence was at once restored. A few minutes later a great branch crashed to the ground, but the birds hardly glanced up, so perfectly did they judge between actual danger and a harmless jungle happening.

Plate XXXV. SIAMESE CRESTED FIREBACK *Lophura diardi* (Temminck)

Painted by G. E. Lodge. *Facing page* 116

Sportsmen in Siam who sit up on the look-out for tigers, sometimes see this magnificent bird step out from the jungle and walk slowly past, its fiery golden back flashing even in moonlight. It lives in dense bamboo thickets, and comes into more open jungle, often near the banks of a river, to feed and drink. It is as easy to trap as it is difficult to observe, and the Siamese bring many to the Bangkok market.

Plate XXXVI. PLUMAGES OF THE BORNEAN AND SIAMESE CRESTED FIREBACKS *Lophura ignita* and *Lophura diardi* . . *Facing page* 120

Drawn by H. Grönvold

Fig. 1. Chick of Bornean Crested Fireback, *Lophura ignita.*
Figs. 2. and 3. Bornean Crested Fireback, *Lophura ignita.*
Juvenile plumage of the female (2), and male (3).
Fig. 4. Siamese Fireback, *Lophura diardi.*
Transition plumage between juvenile and first year, showing sequence and nodes of moults and the unusual pattern complexity of the immature wing-feathers.

Plate XXXVII. MALAYAN CRESTED FIREBACK *Lophura rufa* (Raffles)

Painted by G. E. Lodge. *Facing page* 122

A single glimpse of these birds after many hours of nerve-racking search is the usual reward. They are very shy and for ever on the alert for the slight crack or rustle of twig or leaf, but their beauty is worth the longest stalk and the most wearisome wait. They are found in pairs or in small families, and when alarmed go off with a headlong rush through the underbrush in preference to attempting flight.

Plate XXXVIII. BORNEAN CRESTED FIREBACK *Lophura ignita* (Shaw)

Painted by C. R. Knight. *Facing page* 128

This splendid bird chooses to live in low, swampy jungle, coming out to feed in the small, shaded glades. In one such place, embowered with green and decorated with great elkhorn ferns, a family of Firebacks spent many weeks. Although not far from a native Dyak house, yet it was also close to a burial-ground, and the fear of evil spirits gave safety to the birds.

When standing quietly, the colours of the Fireback cocks merge with the hues of the jungle, but at the slightest movement the glittering back detaches itself from the spots of sunlight, and the blue-black body from the dark shadows, and the bird stands out in its full glory.

Plate XXXIX. WHITE-TAILED WATTLED PHEASANT *Lobiophasis bulweri* Sharpe . . . . *Facing page* 146

Painted by G. E. Lodge.

Perched in a tiny half-cave in the rocky side of a deep gorge in central Borneo, I watched the flying lizards, gorgeous as butterflies, pass swiftly from tree to tree, while long-tailed paradise flycatchers swooped after flying insects, in and out of the shadows overhead. Without warning there stepped into view three chevrotain, the tiniest of jungle deer, and with them a quartet of White-tailed Pheasants, one a fully adult male with great, spreading tail sweeping the ground. They walked slowly beneath me, and still unalarmed, passed from view in the direction of the river.

Plate XL. RED JUNGLEFOWL *Gallus gallus* (Linnaeus) . . . *Facing page* 172

Painted by G. E. Lodge.

To the human race this is the most important wild bird living on the earth, for it represents the ancestor of all varieties of domestic fowl. It ranges from the border of Kashmir to Singapore, and is found in the wildest regions, as well as close to native villages, with the fowls of which the wild birds frequently cross. Its crow is bantam-like, and sounds strangely out of place when heard in deep jungle. These Junglefowl are usually monogamous, the hens lay from five to eight eggs.

Plate XLI. CEYLON JUNGLEFOWL *Gallus lafayetti* Lesson . . *Facing page* 212

Painted by G. E. Lodge.

In the dusk of early dawn the Junglefowl begin to leave their roosts and make their way through the thorn thickets of south Ceylon to open glades. Here they send forth their loud crow, *chuck-George-Joyce!* Here they battle with each other, armed with sharp spurs, and here they scratch vigorously for worms and grubs. Sometimes a dozen birds can be heard crowing in various directions, but after sunrise they cease, and with the coming of heat the birds seek shelter under the dense foliage.

Plate XLII. GREY JUNGLEFOWL *Gallus sonnerati* Temminck . . *Facing page* 234

Painted by G. E. Lodge.

The Junglefowl of southern India range from the sea-shore to an altitude of five thousand feet. Mated pairs appear to remain together throughout the year. At the breeding season the birds retreat to distant parts of the jungle, but at other times they often feed openly in trails leading out of villages, especially where cattle are pastured. The spots on the hackles of the cock are like drops of sealing-wax, and unlike any character found in other Junglefowl.

Plate XLIII. PLUMAGES OF THE GREY JUNGLEFOWL *Gallus sonnerati* Temminck . . . . *Facing page* 246

Drawn by H. Grönvold.

The chick in down has very distinct patterns and coloration, and the wing feathers sprout rapidly, so that it can fly a short time after hatching.

The juvenile plumage of both sexes resembles that of the adult female, with usually a hint of the sealing-wax spots on the median wing-coverts of the cock.

A full-grown cock in the eclipse plumage has the specialised neck hackles replaced with black ones. This partial moult lasts only for three months after the breeding season.

Plate XLIV. JAVAN JUNGLEFOWL *Gallus varius* (Shaw and Nodder) *Facing page* 248

Painted by G. E. Lodge.

Early in the morning, before the sun appeared, picking my way quietly through a tangle of cactus on the low-lying Javan coast, with a shrike sitting in every tree, with bulbuls singing from every thicket, there would come across the valley a sharp, crisp, virile *chaw-au-auk!* the challenge of the Javan Junglefowl. With erect iridescent comb and plumage glittering with dew, the splendid wild fowl was leading his family from their roosting-place to the nearest pool of water for their sunrise drink.

PHOTOGRAVURES

Photogravure 16. GARHWAL—THE HAUNTS OF THE WHITE-CRESTED KALEEGE . . . . *Facing page* 14

Photograph by William Beebe.

Deodars, spruce and silver firs cover many of the slopes of lower Kashmir and Garhwal, and offer sanctuary to White-crested Kaleege Pheasants. In the pleasant twilight of these forests, each glade seems to have its own dominant perfume. One is starred with myriad, long-stemmed strawberry blooms; in another the pale blue faces of a multitude of violets show faintly. Shrubs are hung with bright panicles of bell blossoms, and the background of ferns is here and there picked out with the white lacework of saxifrage. Here we find the nest and eggs of this Kaleege, brooded by the patient, brown mother, and here the little chicks, at her alarm note, dive among the leaves and moss and remain motionless until reassured by her brood call.

Photogravure 17. SIKHIM—IN THE HAUNTS OF THE BLACK-BACKED KALEEGE . . . . *Facing page* 34

Photograph by William Beebe.

On the sheltered open slopes, tree ferns filter the sunshine through emerald filigree. In the neighbouring forests we find damp moss hanging from bark, twig and leaves, and the hoofs of deer and the feet of pheasants sink deeply into soft mould. These kaleege are confined to a tiny bit of the earth's surface in Sikhim and Western Bhutan, but dangers are numerous and they are on guard every moment of the day, watching for snakes, civets, or even little mild-mannered mountain bears, who know how delicious a meal these birds furnish.

Photogravure 18. WHERE HORSFIELD'S KALEEGE MAKES ITS HOME

Photograph by William Beebe. *Facing page* 46

These pheasants wander in families or small companies through the dense jungles, coming now and then upon beautiful streams, flowing slowly and quietly around the roots of great trees, or pouring in a headlong cascade over a ledge of rocks. Here the birds slake their thirst and then pass on again into the forest. I once watched a pair of birds scratching and pecking on a hillside among green begonias and jack-in-the-pulpits, making the leaves and twigs fly in all directions. The sound could be heard for many yards, but the vigilance of the birds never relaxed, and at the slightest suspicion of danger they were off like two meteors.

Photogravure 19. NORTHERN BURMA—YUNNAN BORDER—HOME OF THE HYBRID KALEEGE . . . . . . *Facing page* 84

Photograph by William Beebe.

Standing on the high divide which shunts its eastern waters into China and its western into the great rivers of Burma, a great, tumbled, irregular mass of mountains and valleys is seen. All are forest, clad with bamboo, oaks and hard wood, and here, hidden beneath that vast extent of many-tinted foliage, I found the northern Kaleege pheasants.

LINE OF KACHIN PHEASANT TRAPS

The Kachins and other native tribes use a deadly method of trapping. A low fence of split bamboo runs uphill and down for a mile or more, with dead falls every few feet. When this is in full operation, few pheasants fail, sooner or later, to be caught, and whole districts are thus cleared of these splendid birds.

Photogravure 20. A SANCTUARY OF THE HYBRID KALEEGE . *Facing page* 86

Photograph by William Beebe.

The natives of northern Burma captured many specimens of Hybrid Kaleege for me, taking them either in deadfalls or in nooses. But there was one spot near their villages where they would never trap or kill. This was the sacred spot or grove devoted to the Nats or evil spirits. And here the pheasants were safe from molestation, and here they scratched for food and roosted high at night.

PHOTOGRAVURE 21. HOME OF RIPPON'S SILVER AND OF EASTERN HYBRID KALEEGE . . . . *Facing page* 88

Photograph by William Beebe.

Three of these rare hybrids crossed this trail one day, headed into a wild, deep gorge. The mountains rose high on all sides, except to the northward, where the purple distance ended in the jagged ranges of the unexplored tri-corner of Tibet, Yunnan and Burma.

Parrakeets and flycatchers screamed, and at last I heard the tremulous wing-whirr of a pheasant. But it was an hour later before the timid birds appeared—clad in ebony and white, walking slowly downward, on their way to the water, at the bottom of the gorge.

PHOTOGRAVURE 22. HOME OF THE WESTERN HYBRID KALEEGE *Facing page* 90

Photograph by William Beebe.

In western Burma, where the ranges of Horsfield's and the Lineated Kaleege approach or touch, the jungles and lesser growth are inhabited by pheasants which show all degrees of intergradation. Their voice, habits, eggs and young are all more or less alike, but on the plumage of the adult birds is written their blood relationship to one or the other of their parents or more remote ancestors.

PHOTOGRAVURE 23. HAUNTS AND BREEDING-GROUND OF THE LINEATED KALEEGE . . . . *Facing page* 56

Photograph by William Beebe.

In central Burma, east of the Irrawaddy, we find a dense growth of small oaks, chestnuts and pines. Blackberries ripen at the end of the rains, and the Lineated Pheasants come into the grassy fields for berries and grubs. In the early morning it would not be difficult to approach closely, were it not for the flocks of blossom-headed parrakeets which fly off screeching, spying one from afar and warning every creature within hearing.

PHOTOGRAVURE 24. CHINESE HAUNTS OF THE SILVER PHEASANT *Facing page* 64

Photograph by William Beebe.

In Fokien, near the borders of Kiangse, the pheasants of "day and night" live among wild ravines and mountains. There are no large trees, and the dwarf bamboos and shrubs have been cut again and again by the yellow men for fuel. But here, in company with shrikes and mynas, and a flock of magpies, I found the Silver Pheasant near the rivers.

PHOTOGRAVURE 25. HAUNTS OF THE MALAYAN AND BORNEAN CRESTLESS FIREBACKS . . . . *Facing page* 104

Photograph by William Beebe.

In both countries these pheasants live in dense jungle, where they have access to open clearings, or at least the trails made by wild animals. Here they strive to escape their enemies, snakes and civet cats, which lie in wait or creep silently through the undergrowth. And here they nest, although up to the present time no white man has seen nest, eggs or young, so timid are they, and so skilful in hiding their home among the swamps and tangles.

PHOTOGRAVURE 26. HOME OF THE MALAYAN CRESTED FIREBACK

Photograph by William Beebe. *Facing page* 124

In the low, dense jungle of the Malay States, in thickets of thorny tangles and enmeshed vines, these birds live. To study them one must fight hosts of leeches and mosquitoes, mud and rain, or, when the sun appears, the steaming heat of these breathless places. Here the bulbuls sing sweetly, and gorgeous butterflies flap slowly past, and here these pheasants scratch among the dead leaves for food, or walk in the shallow water of jungle creeks, drinking and catching tiny creatures in the sand and gravel.

PHOTOGRAVURE 27. HOME OF THE BORNEAN CRESTED FIREBACK

Photograph by William Beebe. *Facing page* 132

The home of this bird was reached by means of a seventy-foot Dyak war canoe, in which I was paddled up the rivers to the inland jungles. Here, in the haunts of gaily coloured pittas, of glittering sunbirds and the glorious tropical orchids, these birds live and court their mates and rear their young. Often the first hint of their presence is the call of the cock, a low, mumbled *Um—um! Um—um!* followed by a single, sharp, keen whistle, which cuts through the warm, quiet air like a knife.

PHOTOGRAVURE 28. BORNEAN HOME OF THE WHITE-TAILED WATTLED PHEASANT . . . . *Facing page* 150

Photograph by William Beebe.

On the slopes of the rolling hills of central Sarawak, in the warm jungles, sloping down to the yellow rivers, these magnificent pheasants have lived for untold centuries. Only by days of the most patient watching can they be seen, and more often a fleeting glimpse is all that rewards a painstaking stalk.

Beneath the tangles of soft-fronded climbing ferns, or the solid phalanx of bamboos, the birds may remain hidden a few yards distant, and never be discovered. The young birds are less wary, and, trusting more to their inconspicuous colouring, often come into more open spaces, to scratch for food or to preen their plumage.

PHOTOGRAVURE 29. WHITE-TAILED WATTLED PHEASANT . . *Facing page* 160

Photograph by William Beebe.

In the immature White-tailed Pheasant (left) the wattles are short and inconspicuous. In the adult (right) they are long and wrinkled, and at the moment of courtship capable of being considerably elongated.

The head-hunting Sea Dyaks of Sarawak are splendid hunters, and will spend days and nights stalking and trapping pheasants and other birds. With the crudest kind of traps they would capture the birds alive and bring them to me unharmed in wicker quakes.

PHOTOGRAVURE 30. HOME OF THE RED JUNGLEFOWL . . *Facing page* 174

Photograph by William Beebe.

In northern Burma I found the wild Junglefowl coming out to feed along the trails which lead from village to village. They cluck and scratch among the turf, and take dust baths exactly like our domestic fowl, and I have often found it difficult to shoot them, as the action seemed like unsportsmanlike slaughter in a barn-yard. At the first hint of danger, however, they lower their tails and run headlong, like pheasants, into the nearest underbrush.

The nests are hidden away in the clumps of bamboo, a mere hollow being scratched out, or the eggs deposited on the dry leaves.

PHOTOGRAVURE 31. ROOSTING AND FEEDING-PLACES OF THE RED JUNGLEFOWL . . . . *Facing page* 182

Photograph by William Beebe.

These birds roost high up, often on the half-bent curve of a tall bamboo, whose smooth stem ensures safety from arboreal carnivores. As many as thirty birds have been seen roosting close together.

Just as tame fowl are fond of the company of barnyard cows, so the wild Red Junglefowl are often seen in the vicinity of wild cattle, and I have seen them again and again feeding about buffalo wallows. It is almost impossible to flush these birds. They invariably choose to escape by running swiftly away, yet, when surprised by a dog, they have the ability of rising as quickly and strongly as partridges.

PHOTOGRAVURE 32. JAPANESE LONG-TAILED FOWL . . . *Facing page* 194

Photograph by William Beebe.

Of all curious breeds of domestic fowl, none are more remarkable than the Japanese birds, whose upper tail-coverts sometimes reach a length of over twenty feet. The feathers are kept wrapped in soft paper, and the birds themselves spend a most uninteresting life in a high, narrow box, fed by hand and cared for by special attendants.

PHOTOGRAVURE 33. HOME OF THE CEYLON JUNGLEFOWL . *Facing page* 216

Photograph by William Beebe.

Along the coast of Ceylon, where the eucalyptus, acacias and mesquite abound, these Junglefowl are abundant. The region is park-like, the thorn-bushes and trees alternating with glades or larger open plains, dry and sandy, or with pools and grass. Here they must ever be on the watch for leopards and civet cats, and at night they sleep in dense foliage on lofty limbs, well out from the trunk, so that an enemy approaching along the branch would at once be detected.

Photogravure 34. NEST AND EGGS OF THE CEYLON JUNGLEFOWL

Photograph by William Beebe. *Facing page* 222

The nest is usually placed on the ground at the foot of a tree, and only the leaves and grass already present are used as lining. The hen sits very closely, and deserts her eggs only when danger is actually upon her. Her colours harmonise perfectly with the hues of the dry vegetation, but the eggs, when exposed, are conspicuous. Five or six is the usual number, and they are as small as the eggs of bantams, and sometimes slightly spotted.

A native Vedda, one of the aboriginal Cinghalese, was skilful in tracking down the birds and their nests, and found one of my first nests, which the chicks had just left.

Photogravure 35. CEYLON JUNGLEFOWL . . . . . . *Facing page* 224

Photograph by William Beebe.

In the more arid places Junglefowl often suffer from the attacks of ticks, which attach themselves to their comb in large numbers, and although they will sometimes preen one another's plumage, they seem never to attempt to rid their companions of these pests.

The eggs vary from white to a rich cream colour. Usually they are unspotted, but occasionally eggs will be found which are thickly covered with dots and spots of brownish red.

In trampled places in the thorn-brush, feathers are sometimes found, showing where severe battles have taken place between rival cocks. But this photograph reveals a real tragedy. A cock Junglefowl had been feeding on the insects which it had scratched from a nest of termites, when a civet cat or similar enemy had pounced upon the bird, plucked out many of the larger wing feathers and carried it away.

Photogravure 36. HAUNTS AND ROOSTING ISLAND OF THE JAVAN JUNGLEFOWL . . . . *Facing page* 250

Photograph by William Beebe.

This bird haunts the semi-arid coastal lands of Java, but, not satisfied with its proximity to the booming surf of the tropical sea, I saw two cocks and a hen walk down to the beach, catching insects as they went, and after some hesitation rise into the air as easily as quail, and fly out to a tiny mangrove islet a hundred yards off-shore. Here they found a safe roost for the night, returning to their feeding-grounds in early morning.

Photogravure 37. ROOSTING CLIFF AND HAUNTS OF THE JAVAN JUNGLEFOWL . . . . *Facing page* 252

Photograph by William Beebe.

Jagged ridges of weather-worn coral and stony fields covered with a scanty growth of grass; spiny cacti sprouting everywhere, and an occasional palm or bunch of feathery bamboo—such is the home of the Javan Junglefowl along the coast. In one place I found a number roosting in a limestone cavern beneath the level of the ground. The birds make their way to the more fertile spots near the creeks and search for insects along the rice-fields and crops of ground pea.

Photogravure 38. HYBRID JAVAN JUNGLEFOWL . . . *Facing page* 260

Photograph by William Beebe.

The wild Junglefowl do not interbreed with the native poultry, but in captivity the two species will occasionally cross. Some of these hybrids are huge creatures, with enormous pendant combs, and beautiful plumage; others are small and bantam-like with absurdly short legs. They are great favourites with the Javanese, who keep them on triangle perches or in ingeniously woven quakes or cages. The dominant character of these birds is the voice, which lacks cadence or definiteness, but consists of a scream which must carry for at least a mile. This is the stimulus to much betting, and owners of powerful-lunged birds often make large wagers on the vocal powers of the rivals.

PHOTOGRAVURE 39. HYBRID JAVAN JUNGLEFOWL IN ITS AERIAL BAMBOO CAGE . . . . . . *Facing page* 262

Photograph by William Beebe.

The hybrid Junglefowl are sometimes valued as high as six hundred gulden. The chiefs and wealthy natives erect a very tall bamboo pole in the compound, with a primitive sort of pulley near the top. The fowl in its basket is attached to a rope and pulled up, high above all the surrounding trees, to remain throughout the day, sending forth at frequent intervals its loud, piercing scream. It begins its call even while the basket is whirling around on its jerky ascent.

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GENNAEUS

KALEEGE PHEASANTS

GENNAEUS

KALEEGE PHEASANTS

Family PHASIANIDAE

Subfamily PHASIANINAE

Genus *GENNAEUS*

THIS group is the largest component of the old genus *Euplocamus*, which formerly included *Diardigallus*, *Lophura* and *Acomus*. It seems to me to consist of two well-marked subgenera, *Gennaeus* and *Hierophasis*, the former with seven species, the latter with two. The species most familiar to those who keep pheasants or have opportunity of visiting collections is doubtless the Silver Pheasant, or Kaleege. One of the native names throughout the East is Kaleege or Kalij, and I have chosen to use this to characterize the pheasants of this genus.

The least specialized type of Kaleege Pheasant is quite fowl-like, especially as to shape of body and carriage of the tail, the latter consisting of sixteen feathers, laterally compressed. These are strongly graduated in order from without inward, the central pair being the longest, and at least three times the length of the outermost. There is great variation in the actual and relative length of the tail as a whole.

The sexes are very dissimilar in colour, and both have crests usually long and flowing (*Gennaeus*), rarely short, lying close to the head (*Hierophasis*). In the birds with long crests, these may end in a point, or else be diffuse, covering the nape and hind neck. The crest is usually disintegrated. In the subgenus *Hierophasis* many of the contour feathers tend to convexity at the tip. Aside from this, there is no specialization of feather structure.

The bill is moderately stout, strong and curved, being used as a pecking organ in assisting the scratching function of the feet. The face is entirely bare, the skin being covered with finger-like papillae, and showing a tendency to the formation of three pairs of free wattles, one in front of and above the eye, the second back of the eye at the side of the occiput, and the third at the gape. In related genera these are carried to the point of highest development in *Lobiophasis*. The 1st primary is considerably shorter than the 2nd, which is equal to the 9th or 10th;

the 5th or 6th is slightly the longest. The tarsus is much longer than the middle toe and claw, and is armed in the male with a pair of stout, curved and moderately long spurs. The feet and legs are strong, and vary greatly as to colour, being scarlet, greenish, whitish or brown.

A generalized brownish olive is the dominant colour of the females, more or less variegated with buffy yellow, white and black. The secondary sexual characters of the males, with the exception of the spurs, consist only of increased size and more specialized colour and pattern. This latter shows great variation, what may be taken as the most generalized being an equal black and white vermiculation, producing a grey effect. On the one hand, we find a disappearance of the white, giving us a series of black, or metallic glossed birds, with solid patches of white, and greyish under-parts; and again a dominance of the white, the black lines being greatly reduced. Finally the metallic hue may be varied so that the bird is brilliant in blue, green and dull crimson. In the metallic group the feathers of the rump tend to be truncated, with a disintegrated fringe, which may be of a special colour or even structurally specialized. This hints strongly of the still more modified rump in *Lophura* and *Acomus.*

GENNAEUS

	Type
Gennaeus Wagler, Isis, 1832, p. 1228	*G. nycthemerus*
Nycthemerus Swainson, Class. Birds, II. 1837, p. 371	„ „
Alectrophasis Gray, List Genera Birds, ed. 2, 1841, p. 78	*G. cuvieri*
Grammatoptilus Reichenback, Nat. Syst. Vögel, 1852, p. 30	*G. lineatus*
Hierophasis Elliot, Mon. Phas. 1872, p. 2, text to pl. XXV.	*G. swinhoii*

For many reasons the genus *Gennaeus* is the most interesting in the family *Phasianidae*, and especially because of the puzzling nature of many of the forms. In the field, my experience with these birds extended from the haunts of *albocristatus* in Kashmir to *nycthemerus* in Fokien, and from *horsfieldi* in Upper Burma to *lineatus* in Lower Burma. I collected, or made notes upon, many of the forms, not only of adults in full plumage, but of moulting birds and those in immature dress. Forearmed with the details of what had already been published on the subject, I was able to search more intelligently and with more direct design than would otherwise have been the case. More than this, however, was the aid given by the English sportsmen in Burma, who in some cases furnished me with data and specimens which were of the greatest help. In one or two instances these were the very men who had collected the original types, so their assistance cannot be over-estimated. It seems quite certain that any future investigation of this group will but slightly affect the general results I have reached. I feel all the more certain in stating this belief because I find myself in almost perfect agreement with the general conclusions of Prof. Alessandro Ghigi, at least as regards the method of evolution of these birds. It is most significant that while the conclusions of this Italian ornithologist were reached by a study of the phenomena of experimental hybridism, and those of mine by independent observation of wild shot individuals, our results differ only in very minor details. His paper to which I refer is *Ricerche di Sistematica Sperimentale sul genere Gennaeus Wagler.*[1]

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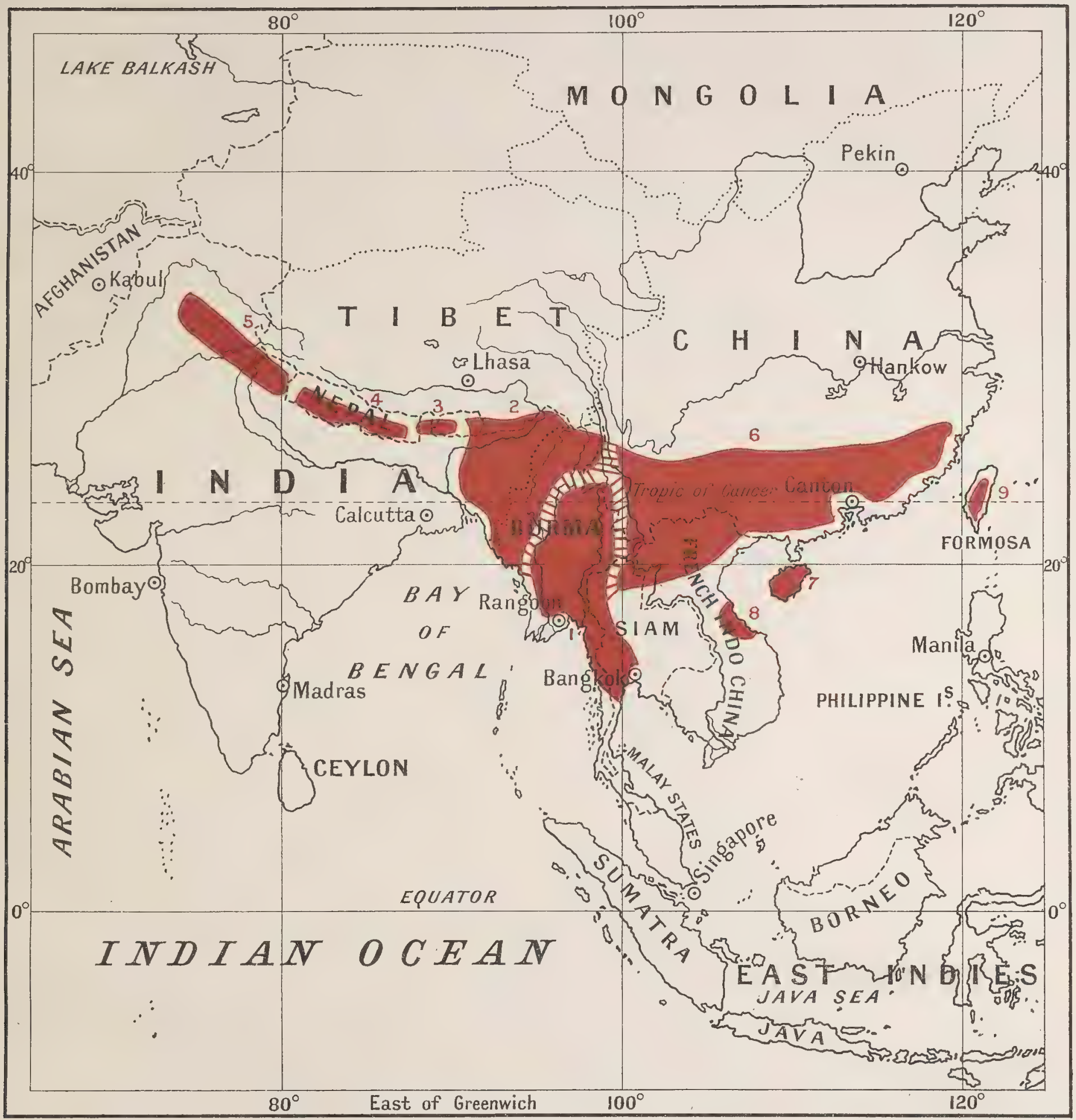
[1] Memoria R. Accademia Scienze dell' Instituto di Bologna (Bologna, 1909).


80°
100°
120°
LAKE BALKASH
MONGOLIA
Pekin
40°
AFGHANISTAN
Kabul
TIBET
Lhasa
CHINA
Hankow
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NEPAL
INDIA
Calcutta
Tropic of Cancer
Canton
9
FORMOSA
BURMA
FRENCH INDO CHINA
20°
Bombay
7
8
BAY OF BENGAL
Rangoon
1
SIAM
Manila
ARABIAN SEA
Madras
Bangkok
PHILIPPINE IS
CEYLON
MALAY STATES
Singapore
SUMATRA
EQUATOR
BORNEO
0°
INDIAN OCEAN
EAST INDIES
JAVA SEA
JAVA
80°
East of Greenwich
100°
120°

H.F.& G. Witherby, Publishers.
Stanford's Geograph! Estabᵗ.

MAP SHOWING THE DISTRIBUTION OF THE KALEEGE.

Region 1. Gennaeus lineatus.
„ 2. „ horsfieldi.
„ 3. „ melanonotus.
„ 4. „ leucomelanus.
„ 5. „ albocristatus.

Region 6. Gennaeus nycthemerus.
„ 7. „ whiteheadi.
„ 8. „ edwardsi.
„ 9. „ swinhoei.

The barred zones show where connecting hybrids occur.

The tangle which has arisen about this genus centres in Burma, and, in a word, the whole question resolves itself into whether the numerous forms which have been described from that country are valid species and subspecies or only hybrids, the naming of which might be continued indefinitely without benefit to the understanding of the genus.

In order even to begin to clear up the problem it is necessary to have a definite starting-point, and for this I have chosen the Lineated Kaleege (*G. lineatus*). Geographically and pigmentally this species occupies a central position. From the point of view of colour and pattern it is the most generalized of all the species, while its uniformity over a considerable range leaves no doubt as to its right to true specific recognition. The black and white on the upper plumage is broken up into fine vermiculation, the two being about equal in extent, the specialized colour extremes of solid whites and blacks being thus lacking. A further hint of its more generalized type is the superficial resemblance which it bears to the related tropical genera, *Acomus* and *Lophura*.

From this point, even a superficial survey of the genus shows two, and very probably three, main lines of divergence. To the north and westward along the Himalayan terai extends a succession of dark-feathered birds, in which the whites are reduced or concentrated on certain limited portions of the plumage. From east to west these are *horsfieldi*, *melanonotus*, *leucomelanus* and *albocristatus*. In all four there is a small amount of variation, but, *inter se*, no actual crossing has ever been recorded in a wild state, nor did most careful search and inquiry on my part reveal a single instance. I have taken this up in detail in my monograph descriptions, and there is no need to reproduce it here.

It is important to note that the distinctions between the Himalayan Kaleege Pheasants have been shown by Ghigi to behave in experimental crossing exactly as though they have been derived by mutation, not blending as do the characters of the Burmese birds.

To the north-east of *lineatus* we find a second line of *Gennaeus* Pheasants, of which the most widely distributed is *nycthemerus*, the Silver Kaleege. On the island of Hainan is an offshoot from this, *whiteheadi*, quite close to the typical species, but, of course, worthy of specific recognition on account of its complete geographic isolation.

A third line, quite distinct from *lineatus*, is found to the south-east in Annam. This is *edwardsi*, whose connection with *lineatus*, at least as a direct offshoot, is at present somewhat obscure. It is known only from a few specimens from Annam, and its rather close relationship with *swinhoei* is of great interest. The latter inhabits the island of Formosa, and with its tropical, *Acomus*-like brilliance of colour differs much from *nycthemerus*, the only species at present inhabiting south-east China. *Edwardsi*, however, shows a very probable former derivation, less specialized, and much nearer the supposed centre of origin.

After carefully going over all the data available, I cannot see that there are any other species worthy of recognition on grounds similar to the nine Kaleege I have mentioned.

Centring our attention again on Burma and the adjacent Chinese states, we find that most of the country is occupied by three species, *lineatus*, *horsfieldi* and *nycthemerus*. Now in all the genera of pheasants there is, as far as I know, no case of two congeneric species occupying the same territory. This was not true as long as *reevesi* and *soemmerringii* were included in *Phasianus*, a very obviously erroneous association, which I have attempted to better.[1] We find that, in addition to the nine *Gennaeus* I have already mentioned, there have been described under binomial names no fewer than thirty-six forms. Almost without exception these are all found within the range of one or the other of the three above-mentioned, widely-distributed species, and not only this, but they occur along the borders where the three approach one another. After studying these forms from every possible point of view, there is no doubt whatever in my mind but that all are natural hybrids.

After the three main types of Kaleege became differentiated, they seem to have approached one another again, working along the narrow, intersecting valleys of Central and Upper Burma, where cross-breeding took place, apparently as freely as it does in captivity. The English ornithologist, Mr. Eugene W. Oates, towards the end of his life became interested in the Burmese Kaleege, and gathered all the specimens possible. He had no belief in the hybridizing of these birds, and so strong was this attitude, that the naming of new forms became an obsession with him. He grew intolerant of criticism and welcomed neither argument nor proof, however convincing, that any of his species were other than normally evolved forms. But aside from this his work was sincere, and however limited his ability to view the subject from more than one angle, he at least laboured to gather together a splendid collection, and we are greatly indebted to him for giving this unusual phenomenon such prominence.

Of the thirty-six so-called species Oates is responsible for nineteen, a goodly percentage of which are based on single specimens.

The conclusions which Ghigi draws from his experiments seem important enough to quote in full, both the original and the translation:

"Returning to the birds forming the subject of the present study, if we proceed to examine *G. leucomelanus* and *G. horsfieldi*, or rather this last one and *G. lineatus*, we see that they differ in a complexity of characters which, in the hybrids, are so arranged as to produce an intermediate form, or else they transmit them in a different association from that existing in the progenital species. Granted that these intermediate forms, or with characters associated in a different manner, may be constant in their descent, it is clear that two distinct species have the power to give origin to a new form by crossing.

"If, however, we consider *G. leucomelanos* and *G. muthura*, or else the first and *G. albocristatus*, it is clear that from hybrids between them we are not able to obtain new forms, as the difference consists in each case of only one pair of characters, antagonistic and unresolvable. The hybrids of the first pair will have the white fringe on the rump or will not be provided with it; those from the second pair will have the crest black or will have it white; they will belong then either to one or the other species, and even if they should be intermediate in the sense of having the white fringes not as large as in *leucomelanos*, or the crest not as light as in *albocristatus*, it is plain that they cannot give origin to any new subspecies, because from what I have shown in my researches, and from what is established in the numerous hybridological literature of to-day, these hybrids, which differ by only two antagonistic characters, give place in successive generations to the separation of such characters according to the formula of Mendel, returning thence to the pure progenital species."

---

[1] Beebe, Preliminary Pheasant Notes, "Zoologica," I. No. 15, p. 283.

Riportandomi agli uccelli che formano oggetto del presente studio, se noi prendiamo esaminare il *G. leucomelanus* ed il *G. horsfieldi*, oppure quest'ultimo ed il *G. lineatus*, rileviamo che essi differiscono par un complesso di caratteri i quali, negl'ibridi, si fondono in maniera da produrre una forma intermedia, oppure si trasmettono in associazione diversa da quella esistente nelle specie progenitrici. Dato che queste forme intermedie od a caratteri diversamente associati, siano stabili nella loro discendenza, è chiaro che a due specie distinte compete la facoltà di dare origine per incrocio a nuove forme.

Se invece consideriamo il *G. leucomelanos* ed il *G. muthura*, oppure il primo ed il *G. albocristatus*, è chiaro che dalle unioni provocate fra di loro non si possono ottenere nuove forme, in quanto la differenza consiste per ciascun caso in una sola coppia di caratteri antagonisti ed indecomponibili. Gl'ibridi della prima coppia avranno le frange bianche sul groppose o ne saranno sprovvisti; quelli della seconda coppia avranno il ciuffo nero o lo avranno biancastro; apparterranno dunque nettamente o all'una od all'altra specie, e quand'anche essi fossero intermedi nel senso di avere le frange bianche non cosi ampie come nel *leucomelanus*, od il ciuffo non cosi chiaro come nell'*albocristatus*, è evidente che essi non possono dare origine ad alcuna nuova sottospecie, perchè da quanto ho esposto nelle mie ricerche, e da quanto si rileva nella numerosa letteratura ibridologica odierna, questi ibridi i quali differiscono per due soli caratteri antagonisti, danno luogo nelle generazioni successive alla separazione di tali caratteri secondo la formula mendeliana, ritornando quindi alle specie progenitrici pure.

The genus *Gennaeus*, as I conceive it, is thus a fairly well-marked group inhabiting moderate elevations in mountainous countries along the southern Himalayas, and eastward throughout Burma and South China. Nine valid species of Kaleege are recognized in this work, as follows:

White-crested Kaleege	*Gennaeus albocristatus* (Vigors).
Nepal Kaleege	*Gennaeus leucomelanus* (Latham).
Black-backed Kaleege	*Gennaeus melanonotus* (Blyth).
Black-breasted Kaleege	*Gennaeus horsfieldi* (Gray).
Lineated Kaleege	*Gennaeus lineatus* (Vigors).
Chinese Silver Kaleege	*Gennaeus nycthemerus* (Linn.).
Hainan Silver Kaleege	*Gennaeus whiteheadi* Grant.
Edward's Kaleege	*Gennaeus edwardsi* Oustalet.
Swinhoe's Kaleege	*Gennaeus swinhoii* (Gould).

This is by far the most conservative opinion which has been expressed upon this group. In 1895 Ogilvie-Grant, with very little material, admitted eight species and three subspecies, Professor Ghigi allowed twenty-four species, Sharpe in the "Hand-List of Birds" recognized sixteen, and Baker in his 1915 revision lists eight species and eight subspecies. In my first review of the group ("Zoologica," No. 17, 1914) it seemed to me that nine species and four subspecies were legitimate, but on a final examination of my material, taking feather by feather, wings, tail and contour plumage, and with the addition of a number of recently collected specimens, I find too great variation in the intermediate forms to permit consideration of them as other than hybrids. Two male *lineatus* from the heart of the supposed *oatesi* territory and a pair of mated birds, ♂ *lineatus* and ♀ *sharpei* from southern Siam helped to bring me to this conclusion.

The phenomenon of the hybrids is, however, of as great interest as if they had been geographical subspecies.

Throughout my explorations in the *Gennaeus* country, from the humid, hot terai of Kashmir and Garhwal, to the coastlands of Fokien, I was constantly impressed with the apparent quick reaction of the plumage pigment to the environmental conditions. At the time I wrote of this in my descriptions again and again, and I have allowed these interpretations to stand in the monograph text. But I cannot accept this explanation as covering the entire question. The same thing has struck Baker, and he tends to give humidity and other meteorological factors considerable weight. Speaking of the Himalayan birds, of the Lineated and the Silver Kaleege respectively, he says, "Thus we find that the black and very dark birds inhabit areas of dense forest at comparatively low elevations where there is a heavy rainfall, and which are therefore well provided with rivers, lakes and swamps. Next we see that the grey birds inhabit hills of moderate height covered with mixed forest, bamboos and grasslands, and with a moderate rainfall. Thirdly, we obtain the white birds only in hills and plateaux at a considerable elevation where the grass-covered and open country exceeds in extent the forest, and where the rainfall is slight or even scanty.

"We thus have it demonstrated that great humidity and heat, with its constant tropical growth of vegetation, induces black in the plumage of the birds of this genus, whereas the coldness of the higher mountains, combined with a drier atmosphere and its consequent higher forests and more open grasslands, induces white. These four factors, temperature, humidity, elevation, and vegetable growth, we shall find, therefore, are the principal ones governing not only the differentiation of the species, but also of the intermediate subspecies."

Believing thoroughly, as I do, in the darkening effect of humidity, it seems reasonable that this explanation is correct. But I am convinced that it only partly explains the changes in coloration, and that we shall have to await the discovery of unknown factors to be certain. I have kept Himalayan and Silver Kaleege in captivity, under the same extremes of humidity, for many years, have cross-bred and bred them pure, and I have never noticed any change in successive moults or successive generations, either toward melanism or albinism. As I shall mention elsewhere I have shot wild birds from the same flock which differed widely from one another, and in Fokien I have found Silver Kaleege living in numbers in low, coastal, humid country. While these arguments are only partial, yet they make us wary of accepting a wholesale explanation of the Kaleege pigmentation. It is a problem of transcendant interest, which it is hoped may be elaborated before these birds become extinct in their native haunts.

KEY TO *GENNAEUS*

- I. Colour dominately black and white (males).
  - a Lesser and median wing coverts black and white.
    - *a′* Black and white equal . . . . *lineatus.*
    - *b′* White dominant over black.
      - *a″* Outer web of outer tail feathers streaked with white . . . . . *nycthemerus.*
      - *b″* Outer web of outer tail feathers wholly black . . . . *whiteheadi.*
  - b Lesser and median wing coverts glossed with blue.
    - *c′* Crest white . . . . *albocristatus.*
    - *d′* Crest black.
      - *c″* Under parts greyish white.
        - *a‴* Rump fringed with white . . . . *leucomelanos.*
        - *b‴* Rump not fringed with white . . . . *melanonotus.*
      - *d″* Under parts black . . . . *horsfieldi.*

c Lesser and median wing-coverts glossed with green.
e′ Scapulars greenish-blue . . . . *edwardsi.*
f′ Scapulars crimson . . . . *swinhoei.*
II. Colour dominately brown (females).
a Feet scarlet.
a′ Crest well developed.
a″ Lower parts entirely olive brown . . . . *nycthemerus.*
b″ Lower parts variegated with light, dark and black streaks . . . . *whiteheadi.*
b′ Crest very short.
c″ Primaries uniform brown . . . . *edwardsi.*
d″ Primaries barred with chestnut and black . . . . *swinhoei.*
b Feet greenish, brown or whitish.
c′ Back with light V-shaped stripes; lower parts with white and black V-shaped stripes . . . . *lineatus.*
d′ Back uniform; lower parts with lighter shaft-stripes.
e″ Crest straight and rigid . . . . *horsfieldi.*
f″ Crest refulgent.
a‴ More greyish brown (Western Himalayas) . . . . *albocristatus.*
b‴ More blackish brown (Nepal) . . . . *leucomelanus.*
c‴ More rufous brown (Sikhim) . . . . *melanonotus.*

WHITE-CRESTED KALEEGE

Gennaeus albocristatus (Vigors)

Names.—Specific: *albocristatus*, L. albus et cristatus, white-crested. English: White-crested Kaleege. French: Faisan à huppe blanche. German: Weisshaubenfasan. Native: Kalij or Kaleege (Kumaon and Garhwal); Kookera, Kala-Murgha, Meerghi-Kaleege (Hills north of Mussooree); Kaleysur (male) Kalaysee (female), (Pahari Hindi); Kullu, Mandi, Suket; Kolsa (Western Punjab).

Brief Description.—Male: Long, hairy crest white; upper parts and throat glossy steel-blue; mantle and upper tail-coverts narrowly, lower back and rump broadly margined with white; fore-neck and breast dirty white, shading on the remaining under parts into whitish-brown lanceolate feathers. Female: Hairy crest brownish-grey; plumage in general reddish-brown, brighter on the rump and under parts, the upper parts finely mottled with black and edged with grey; wing-coverts and under parts edged with white; under parts with white shafts. In general paler than the other Himalayan Kaleege.

Range.—Lower and middle ranges of the Western Himalayas.

THE BIRD IN ITS HAUNTS

Down from the Tibetan snow-peaks a chilly wind came roaring through the spruces. In its wake swirled a dense cloud of pearly-grey, dimming the foliage, obliterating the distant slopes. Then, peal after peal of thunder reverberated through the mountains. Between two rough-barked deodars I was crouched in my green umbrella tent on the watch for kaleege or koklass pheasants. As the wind howled past, the tree-trunks creaked and groaned, dead twigs hurtled down upon the canvas, and I hung tightly on to the pole to keep the tent from blowing bodily away. As the last echo of thunder died out, the loud call of a koklass pheasant came from far off among the deodars and below me a kaleege called. Then the storm passed quickly. The grey haze across the western valley, etched with long, sloping lines of rain, showed how closely I had escaped a drenching. A glow of light touched a rocky peak to the north, and with terrific speed the sunlight swept toward me, down to the tumbling stream and up again, bursting upon me with a glow of warmth which effaced every trace of chill from the air.

Not as yet knowing the habits of the pheasants, I had sought to cover as wide a field as possible during my first day or two of watching. I had pitched my observation tent upon a low saddle, dropping away rather steeply on each side, and rounding upward across the valleys, with their long, dark slopes of spruce and oak. The hillsides were partly bare and grassy, partly covered with low, shrubby growth. The shrubs were bright with panicles of bell-shaped blossoms and the setting of green grass held here and there golden patches of buttercups, picked out with the white lace-work of saxifrage.

At this season the pheasants were still courting; the titmice were still in the midst of housekeeping, but other young birds had already left their nests. Two such families—utterly unlike one another—showed themselves near my tent. Up the trunk of a spruce crept two bits of feathered bark, Himalayan tree-creepers, one quickly and searching every cranny, the other slowly, rather uncertainly. Not a sound did the young creeper utter, but from time to time fluttered his wings in that never-to-be-mistaken pleading for food of a young bird.

The second nursery scene was enacted upon a lofty bough of a dead spruce. A series of complaining, feline mews attracted my attention, and there perched a great, full-feathered, baby nutcracker, flapping its wings and endeavouring to look starving and dependent. One of the parents approached, and the mewing increased to a perfect medley of cries, screams and croaks—all merging at last into a contented mumbling gurgle as the food was crammed down its throat. Here we had the greatest contrasts of creation: the defenceless, weak creatures of the wild, who trust to silence, dull feathering and cautious, mouse-like creeping up of tree-trunks to preserve them from their enemies, and the blatant, care-free ones who, from their combative ability, know that they may mob a hawk with impunity, and hence may cry aloud their every emotion, perch in full sight of the world and yet live.

A sudden sharp cry and much craning of neck on the part of one of the parent nutcrackers led my eye downward, and cutting a new loophole in the tent, I was surprised to see a big bear nosing unconcernedly among the buttercups and turf halfway down the slope. This was the second time I had encountered bears in my search for pheasants. As he dug deeper and the earth tickled his nostrils he uttered sundry snorts and coughs, but appeared to find edible somethings which compensated him for the discomfort. He moved slowly on and upward until he was not more than forty feet from the tent, and I reached out behind and worked my three-barrelled gun into a more convenient position.

The use he made of his senses was interesting. Although fully half of my tent was in view and far from matching the dark green of the deodar needles, yet the bear saw nothing unusual, even when staring straight at me. Ever and always his mobile snout curved upward from his teeth, and his nostrils quivered, but even those wonderful organs told him nothing of my whereabouts, the breeze blowing down the valley, carrying every scent before it. His sleek coat glistened in the sunlight, bowing out in smooth, rolling curves as with each motion the great muscles rippled under the skin. Now and then he seemed to scent some particularly delicate morsel, and in his eagerness to root it out he moved slowly about the hollow, almost encircling it, with his muzzle buried deep within it. A flat hind foot would be lifted and held trembling as he lunged and lunged with bare teeth to scrape the tuber or succulent root.

The sun had dropped low toward the jagged ridge top when a White-crested Kaleege appeared—the first I had ever seen in its native wilds. I knew it even when, fifty yards away, it stepped for only a moment into view. A breath of air caught the long, filmy crest and splayed it out—glistening white, at this distance, against the dark of the plumage. The bird vanished, then reappeared higher up. Suddenly a second black bird beat swiftly along the slope toward me, dodging through the rose and raspberry bushes, and sailing gracefully to the ground. Just before it alighted the white crest and black feathers flashed out—a second cock kaleege. The moment it stopped it straightened up, and with strong, vigorous beats it sent forth its challenge, a deep, reverberating wing-drum, *woof-woof-woof-woof! woof! woof!*

All this took place just below and within a few yards of the bear. The bird looked at the great black form intently, but showed no symptoms of terror, and a moment later the bear discovered the pheasant, stretched out his nose, sniffed, and went on with his grubbing. The bird went behind a bush, and immediately there came forth a great scratching and scuffling among the dead leaves. I marvelled at the recklessness of this usually wary bird, but the noise was explained when a single small babbler appeared, still scratching up the debris, or picking the leaves up one by one and hurling them over its back, after the manner of ant-thrushes in the South American jungles. This one small bird made a far greater disturbance than the pheasant and bear together. When the kaleege again came out it walked slowly past the bear, making a slight detour, but within twenty feet, and actually, when a few yards uphill, leaped upward at a panicle of blossoms and caught some insect. So accurately do the wilderness folk gauge one another's possibilities of harmfulness !

But at this point the pheasant saw my tent, and though there was no sudden alarm, yet a long, searching scrutiny left a suspicion, which dominated all other feelings, and with tail and head raised, with graceful, dignified steps, it made its way ten yards or more along the slope of the hill before it ventured to pass the tent. On the summit the bird hesitated a moment, standing silhouetted against the distant peaks and the sky, a beautiful symbol of alert eyesight and poised body.

In the never-ceasing warfare of the Himalayan jungles, this individual was a success ; it had pitted its weak form, but keen eyes and ears, against the powerful muscles and delicate power of scent of the beasts of prey. As this thought came to mind a fox barked in the distance. The bear gave a last snort, left his field of manna and ambled slowly over the ridge beyond me. He had not descended twenty feet before he stopped, as if blocked by some insurmountable, material wall. For one instant his nose was stretched out toward me, distorted with the agony of supreme endeavour, and then, whirling in his tracks, he fled over rocks and turf, tearing through shrubs and bushes headlong, recklessly, from the dread hidden danger. I wished him luck in his strange life—a creature who by teeth and relationship should be meat-eating and animal-slaying, but who prefers berries and roots and a fat, easy life, seldom or never molesting the hunter unless wounded or in defence of cubs. How did the pheasant know this ? How too did the pheasant read danger in the first retrogade movement of the bear, for no warning scent had come to its all but dead nostrils, and only the vaguest of suspicions through eyesight ? Yet at the sudden turn of the bear the kaleege leaped into the air with a single subdued note, and after a few rapid wing-beats sailed in a beautiful long, descending curve far down into the valley, almost to the stream for which it had been headed. Thus was a bird's thirst quenched the quicker, and that of a bear delayed by my hidden presence on the ridge top.

In the shadow of the hill I began my long walk back to camp, passing through the favourite feeding-grounds of the White-crested Kaleege. The slight breeze had died down, and as I reached the zone where rain had fallen, the air became heavy with scent. In passing through the pleasant gloom of the conifer forest each glade seemed to have its particular dominant perfume, governed by the predominating blossom of this lush season of the year. One was starred with a myriad long-stemmed strawberry blooms ; in another the pale blue faces of a multitude of violets showed faintly—more noticeable by the sweetness of their odour than their colour. The dominant hue of the forest blossoms was white, and in another glade was a host of large anemones, many splashed with bluish on the under side of their petals. Elsewhere, and thriving as well in the shade of the spruces as in the glades, were mysterious, fairy star blossoms, flowering apparently on the dead stem of last year—a strange resurrection—while the new, downy leaves sprouted independently on a new stem from the ground. These too all had their individual odour.

Most fragrant and evident to this dulled sense of ours were the spicy perfumes of the trees themselves. Who can describe these, or who, in the case of the spruce, needs to? It was the same bracing, keen-cut scent that greets one in the Canadian wilderness; that crosses the bow of one's sampan in the rivers of eastern China; that soothes one to sleep in the Rockies, or that is borne on the velvet breeze from a Florida "hummock." The silver fir sent down this Himalayan valley a strong, resinous odour, as penetrating as the points of its blue-green needles, while the fragrance of the spruce was fully as aromatic, but less pungent. One could call it almost sweet, were it not for the perfume of the real flowers. The deodar—tree of God—had a fainter fragrance, but none the less spicy and resinous.

And so, as the dusk of twilight approached, I made my way past the scratched-up turf of the glades, where, during the day, the pheasants had sought and found their food, who now, their thirst quenched, were seeking their safe roosting-places high up among the branches of the spruce or fir. A few would succumb before the dawn to the sudden attack of marten or weasel, others would awaken in early morning, send forth their challenge and begin anew their daily life.

GENERAL DISTRIBUTION

This kaleege is confined to the Western Himalayas, inhabiting the lower and middle ranges from Hazara on the west, through Kashmir, Garhwal and western Kumaon, but probably not actually found in Nepal itself. On the south it is found in the outer range of the Siwaliks at a thousand feet elevation, up to a height of ten thousand feet near the snows of the mid-Himalayas.

General Account.—The preference which the White-crested Kaleege shows for the vicinity of native villages, together with its comparatively unsuspicious nature, has tended to make this quite the best known of Western Himalayan pheasants. Several accounts have been written of it, those of Wilson and Baldwin being perhaps the best. I have added to the observations which I was able to make those which could be obtained only by some one resident throughout the year in the haunts of this bird.

There are few types of localities within its range which are not at one time or another frequented by the White-crest. On the other hand, after finding the exact kind of forest which in one place is beloved by this bird, the same species elsewhere may be found confined to an entirely different vegetation zone. As with other game-birds in these mountainous regions, the annual migration is little more than one of altitude. In the autumn and winter almost all the birds will be found low down on the outlying flanks of the Siwaliks, perhaps a thousand feet or less above sea-level, or at the bottom of the lower valleys in the more central ranges of Garhwal. Here they frequent old grain-fields near water, or camping-places near more or less frequented roads. In the summer they work upward to an elevation of nine or ten thousand feet. Only a few individuals, however, attain the latter height, but I have found them in abundance at seven and eight thousand feet.

Their fearlessness in approaching the habitations of man is in striking contrast to the habits of most of the pheasant family. Even though in any one region there may be comparatively few White-crested individuals, yet the frequency with which they show themselves at the edges of grain-fields and along roads may give the impression of a very common bird, whereas in an Impeyan country, while there may be many more individuals within as limited a zone, yet it is seldom that one is able to catch even a glimpse of more than a single bird.

Especially in the winter months, the kaleege is to be looked for in the rather open forest, along the borders of the more dense jungles, in overgrown thickets near long-deserted cultivated patches, ruined cowsheds and even inhabited native hamlets. In fact it is seldom or never that the bird is found in remote, isolated forests. Where the White-crest is, there, or in the vicinity, one may almost certainly expect to find the presence of man, or at least some trace of his former occupancy. One writer has well summed up the favourite haunts of the bird as "among the thick clumps of bushes and shrubs near the banks of rivers, in low valleys through which streams of water run, and on the slopes of hills where there is plenty of low bush cover, especially thorny thickets bordering on cultivation. In the early morning the vicinity of an old, deserted cowshed is a sure resort of this bird if anywhere in the neighbourhood. I have flushed this pheasant and the common red jungle-fowl from the same description of cover at the foot of the hills."

I have found the low mountain bamboo or ringal to be a favoured cover during the day, and in the interior of Garhwal it frequents damp evergreen forest, and the proximity of streams at the bottom of shady ravines. Elsewhere I have found it at six thousand feet in a semi-arid country, partly bare, partly covered with dense euphorbias, with daisies and edleweiss-like blossoms relieving the stretches of barren rock. Still higher it was in dense undergrowth in coniferous forest, varied with oak saplings, raspberries and wild rose. And finally I have flushed the White-crested Kaleege from an almost pure culture zone of rhododendron forest. The typical forest floor where these kaleege love best to wander and feed is carpeted with a thick matting of dead leaves, through which sprout maiden-hair ferns and many other species; coarse and feathery-fronded brakes; ill-smelling filmy white flowers, and lilies-of-the-valley giving forth the most delicate of perfumes; Solomon's seal, and a host of tiny deodar shoots.

On the whole this pheasant cannot be said to be gregarious. But monogamous they certainly are—despite more than one accrediting of polygamy. I have never seen more than a pair together at the breeding season. At other times single cocks are not uncommonly to be met with. When three, four or more are seen associated the majority will be found to be birds of the year. Even when ten or a dozen pheasants are flushed from a single bit of woods, the association is usually accidental, or due to a local abundance of food. At a high altitude I once watched for several days a little open platform, jutting out from an evergreen forest, which was frequented by kaleege. On four consecutive days there were four, eight, four and

GARHWAL—THE HAUNTS OF THE WHITE-CRESTED KALEEGE

Deodars, spruce and silver firs cover many of the slopes of lower Kashmir and Garhwal, and offer sanctuary to White-crested Kaleege Pheasants. In the pleasant twilight of these forests, each glade seems to have its own dominant perfume. One is starred with a myriad, long-stemmed strawberry blooms; in another the pale blue faces of a multitude of violets show faintly. Shrubs are hung with bright panicles of bell blossoms, and the background of ferns is here and there picked out with the white lacework of saxifrage. Here we find the nest and eggs of this Kaleege, brooded by the patient, brown mother, and here the little chicks, at her alarm note, dive among the leaves and moss and remain motionless until reassured by her brood call.

GARHWAL:- THE HAUNTS OF THE WHITE-CRESTED KALEEGE

sixteen birds, all busily feeding. The turf was dying from the attacks of innumerable grubs, and it was apparently these which attracted the birds. Of the sixteen seen at once, three were full-grown males, all the rest apparently birds of the year, with many scattered brown juvenile feathers remaining in their plumage. These had not as yet paired off, the breeding season not having begun at this high altitude. A few hundred yards away a single adult pair of pheasants were feeding by themselves for three out of the four days.

When feeding as these were doing, or when, passing slowly through forest, the pheasants are suddenly disturbed by catching sight of a man, they usually run swiftly off, and seldom fly unless come upon suddenly or rushed by dogs, and even in the latter case in dense undergrowth they often choose to lie close and risk discovery until the danger becomes acute. White-crests are never as shy as Tragopans or Impeyans, and where they are not constantly annoyed or shot at by natives or sportsmen, they are as tame as the most amateur hunter Sahib could desire. When walking up a ravine or up the slope of a hill, if pheasants are flushed by dogs somewhat above, they will often fly into the trees just over the sportsman's head, and be so occupied with watching the dogs that several may be shot one after the other. "When flushed from any place where they have sheltered, whether on the ground or aloft, they fly off to some distant cover, and alight on the ground in preference to the trees." In the case of the sixteen birds which I have mentioned as being observed feeding together, at my first shot all flew uphill some forty or fifty yards. This is quite an unusual habit, and it is seldom that they will thus put forth the necessary exertion of actually beating upward. When suddenly alarmed they usually fly down the slope, or as often on a level along the hillside. The kaleege flaps rather heavily, and with rapid beats at the beginning of the flight, but soon acquires terrific speed—greater, several sportsmen have estimated, than the burst of a rocketing English pheasant. Referring again to the sixteen pheasants, five minutes later, when flushed by my native boy, all flew downhill and alighted in trees some distance below me.

When surprised at a distance of twenty or thirty feet in dense underbrush, they never attempt to fly, but invariably run quickly away, with neck outstretched and tail lowered. Wholly undisturbed, and walking along slowly, not feeding, the White-crested Kaleege cock has a splendid carriage, head, crest and tail raised, lifting the feet high and daintily, and occasionally uttering a murmuring sound.

The variety in the many written descriptions of the notes of this pheasant is probably as much due to the fact that they really have an extremely varied vocabulary, as well as to the lack of attention which the average sportsman gives to vocal or other manifestations of a game-bird when it gets up before his gun.

When flushed by a man and actuated by only a comparatively moderate degree of terror, I have always known the birds to utter a rather low whistled clucking, very unlike the noisy koklass, which scream or squawk on any provocation. When flushed by a dog and thoroughly alarmed they begin to cluck the instant they are a-wing, and gradually gain in rapidity and loudness of utterance, the notes being sibilant—*se! se! se! se-se-se-se-se-se*—SIP! SIP! SIP! SIP! SIP! One writer says, "Their call is a loud whistling chuckle or chirrup; it may occasionally be heard from the midst of some thicket or coppice at any hour of the day, but is not of very frequent occurrence. It is generally uttered when the bird rises, and if it flies into a tree near, often continued some time. When flushed by a wild cat or other small animal, this chuckling is always loud and earnest." Again we read that "the call of the bird, which may be heard at all times of the day, is a sharp *twut! twut! twut!* sometimes very low, with a long pause between each note, then suddenly increasing loudly and excitedly. Generally speaking, when uttering this cry, which at times might be mistaken by any one unacquainted with it for that of some small bird, the kaleege is alarmed by a prowling marten, or a hawk hovering overhead, perhaps a dog, but still oftener it is heard when a pair of cocks are about to engage in mortal combat." The call of the younger birds is noticeably harsher, less sibilant than that of the adult pheasants. Aside from the vocal utterances uttered under stress of excitement or fear, the kaleege is rather a silent bird.

The present genus is characterized by a kind of instrumental music, closely akin to the drumming of the American ruffed grouse, but this whirring, produced by the rapid vibration of the wings, is chiefly of the nature of a challenge, so that I shall treat of it more in detail under the notes on courtship and fighting.

The food, as far as I could ascertain, is obtained only upon the ground. A very reliable observer, however, reports that he has twice seen them perched in bushes, feeding upon berries. Unlike the Impeyan, the pheasants of this genus are essentially scratchers, and, like the common fowl, dig vigorously first with one, then the other foot, sending the earth flying, and in productive spots the kaleege dig hollows of considerable depth and extent. Their food has been rather indefinitely and comprehensively stated to consist of grubs, roots, insects, seeds, berries, leaves, acorns, soft roots and the young shoots of shrubs.

In Garhwal, in the month of May, I found these White-crested Kaleege feeding chiefly upon small moths of several species. *Agrotis consanguinea* Moore, was by far the commonest species, together with several small *Geometridae.* The following is a detailed summary of the food of four pheasants, shot on different days and in different places, but within a radius of twenty miles.

1.—♂ Shot 9.30 a.m. Crop empty; gizzard contained a comminuted mass of food, including an earwig, a small centipede, many small bits of moss and numerous young fern-shoots.

2.—♂ Shot 6 p.m. Crop full, contained 1 spider, 3 small centipedes, 1 moth, 2 small beetles—a Tenebrionid of the tribe *Helopini*, and an *Elater*—20 small snails of several species (*Nanina glauca* Benson, *Nanina percotteti* Pfr., *Cyclotus strangulatum* Hutton); 11 green leaves of *Sarcococca pruniformis;* 1 dead leaf, 3 roots and a large leaf-stalk of a fern, probably an *Aspidium;* 30 three-cornered brown seeds of some conifer; 12 pea-like seeds; 18 white *Daphne* blossoms; several leaves of a *Smilax;* 1 large leaf and many round brown fruits of a *Vitis;* besides a mass of comminuted vegetable matter. The gizzard contained similar food, much comminuted.

3.—♂ Shot 4.30 p.m. Crop contained 38 moths—(all but one were *Agrotis consan-*

guinea Moore); 1 black beetle; 2 small, round snail-shells, and a small amount of vegetable matter. The gizzard contained remains of about a dozen moths; 1 large turreted snail-shell, and considerable comminuted vegetable matter, chiefly leaves.

4.—♀. Shot 6 p.m. Crop contained 14 small moths; remains of moths and comminuted vegetable matter in gizzard.

As I have observed in writing of the koklass pheasant, the higher forests of Garhwal were, during the month of May, alive with small moths, and during the early morning and evening the White-crested Kaleege spent much of their time in scratching among the leaves of the forest floor for these fuzzy but apparently highly appetizing insects. Even at midday I have seen a female pheasant thus engaged, but without much success, while just before dusk I have observed a pair of kaleege rushing here and there after each turn of a leaf, in pursuit of the moths as they rose in short, irregular flights. Twice under such conditions, several white-throated laughing thrushes were close at hand, profiting by the efforts of the pheasants, snatching those insects which flew upward and beyond the reach of the kaleege. As in so many cases elsewhere, these thrushes were very frequently the companions of the pheasants when they were on the move, feeding slowly through open forest, and more than once they spoiled many an hour's careful stalking, by spying me out when as yet the pheasants suspected nothing. It tested all one's power of self-control at such a time to keep from emptying one's gun-barrels into the flock of jeering birds, as they flew close about one's hiding-place, uttering without ceasing their creaky and intensely irritating *see-e-e-e-e-e-p!* each utterance rising to a most disagreeable, shrill, rasping climax.

Whenever I was able to study a single bird or a pair for any length of time, I was impressed with the extremely regular habits or diurnal round of life which they exhibited. I became acquainted with two male birds which lived within a few hundred yards of one another and yet never associated closely. But both fed all day up and down the opposite slopes of a narrow, forested, dry ravine, and in late afternoon, almost synchronously, worked slowly upward and, still a hundred yards apart, passed over the sharp ridge, down to drink at the stream which flowed at the bottom of this small adjoining valley. They then turned some distance back upon their trail up the slope again to roost an equal distance apart in some dense-foliaged conifers. By pitching my observation tent just between the points at which the two birds traversed the saddle of the ridge, I was able to watch and time each bird. They crossed on the way to drink and to roost regularly at 4 p.m., varying not ten minutes during seven days, and in the mornings of at least six days they re-crossed to the daily feeding-ground at 8.10 a.m., never varying more than seven minutes from this mean. On two very unusually warm days the birds delayed their time of passing into the roosting ravine by thirty-five minutes, the two cocks crossing at the very same minute. This short period of observation suggests how much could be learned of interest about these and other birds by a longer period of intensive study, the results of which would be of far greater value than any amount of casual, half-accurate notes.

I found these pheasants roosting in trees from twenty to thirty feet above the ground, and have no doubt that many spend the nights on much higher perches. In all cases the birds were not near the main trunk, but a foot or more out on some horizontal bough, and in all instances but one the bird was alone.

I have mentioned the laughing thrush as an effective, if wholly unintentional, benefactor of the White-crested Kaleege. As to enemies, one can certainly include the pine marten, wild cats and several species of hawk eagles, *Hieraëtus* and *Spizaëtus*, and, perhaps worst of all, as far as the despoliation of the nests is concerned, the grey langur monkeys, which swing through the conifers like a rushing hurricane, leaping and hurling themselves from tree to tree as recklessly as if the tall, narrow spires of the firs made as easy travelling as the wide-branched deciduous forests of lower altitudes. I once found a few bloody tail-feathers of a cock kaleege beside a log with no hint of the murderer—probably some owl—and twice I found remains of broken egg-shells near nests with the clearly-marked footprints of the langurs all about.

Man is, undoubtedly, the worst enemy the White-crested Kaleege has at present, and the bird is becoming scarce in many of its haunts which are accessible to the multitude of military and civilian sportsmen. The birds learn after a while, however, to gauge the danger of their opponents, and then, we read, "they are not birds that, as a rule, afford much sport; you may see a dozen together feeding in the early morning on one of the 'perows' or encamping grounds, in the Siwáliks of the Dhûn, and you may bag a couple; but even with good dogs to help you, they run so fast and fly so far that long and weary will be your hunt before you bag a second couple out of that same dozen after you have once fired. In fact, in such places, unless one has been marked into some neighbouring tree, when you will generally get a shot, it is best to go on sharp, as a quarter of a mile further on, on frequented roads like this, you will meet with others along the track, to which the horse-droppings, containing undigested grain, attract them. I have in old days shot four or five brace in an hour in the early morning on the road and 'perows' when encamped in the Mohan or Lál Darwáza Pass, through which runs the main road to Dehra and Mussooree.

"Generally in the hills you may pick up three or four birds in a day, by beating all likely-looking patches of cover near fields, but it is rare with this species to make a good bag. There are, however, places where you may come across the kaleege almost as thick as pheasants in a Norfolk cover. Such places there used to be close to Bhím Tál and Naukuchia Tál, small lakes not far from Naini Tál, but at a much lower level, and at the former of these I once, early in November, killed eleven and a half brace in less than three hours." Many more records of a bird shot every eight minutes for three consecutive hours will leave but few of these unfortunate pheasants for the delight of posterity.

Speaking of the kaleege in the lower ranges, Wilson says: "In the lower hills, in the absence of larger game, this bird may serve to while away a few hours of the sportsman's time in almost every place where there is wood or jungle; narrow, well-wooded ravines and thickets of low jungles are the places in which to seek it. A good dog is essential; and without one, though a bird may be occasionally picked up, it is hardly worth while going out. In travelling in the interior a dog used to hill-shooting should always, if available, be brought; and with its assistance a few kaleege may be bagged in some of the coppices and jungle passed through almost every day's march, till the regions where larger game is expected are reached."

The method of escape of these birds in the face of attack by sportsmen is varied, and shows considerable intelligence. When a dog arouses an experienced cock bird, instead of losing its head and flying off at once, perhaps to within easy range of the gun, it will sometimes fly up into a tree, uttering its loud clucking all the while. From this point of vantage it will look about in all directions to see if danger other than the dog menaces. Often a single glance will reveal the sportsman, and the bird is off like a flash to safety in the opposite direction.

Again, where the bird is shot at a great deal, it often flies into a tree at the very first approach of the dog, and there remains, crouched motionless in some fork of a branch or in a dense bit of foliage, or pressed close to the trunk itself, so that it is impossible to find it. One may walk around and around, throw stones, halloo at the top of one's voice, and when at last the quick eyes of a native gun-bearer detect it, the pheasant seems simultaneously to sense its discovery, and, like an arrow, it drops from its perch on the opposite side of the tree and is away off down the valley, silently and on scaling wings, before a warning shout can be uttered or a gun raised.

In the reserved forests the kaleege are included in the law which is meant to protect all pheasants during the breeding season, and are supposed to be shot by Europeans only from September 15 to the end of December. As I have said, the kaleege pheasants often enter the grain-fields and feed on the corn, and in return they are snared in large numbers, by baiting with small heaps of grain placed in the fields in which they have previously been observed.

The White-crested Kaleege breeds throughout its range, from the Terai at a thousand feet elevation, throughout the outer Siwaliks, and northward almost to the snows. The highest recorded nest was at a height of nine thousand five hundred feet. At the foot of the hills and lower valleys the hen pheasant begins to deposit her eggs in April. Higher up the breeding season does not commence until May, and this is delayed at still higher altitudes until the middle of June. April 4 and June 20 are the extreme dates at which fresh eggs appear to have been found.

The kaleege are monogamous, and each pair keeps by itself. The cocks are very pugnacious, and fight fiercely, especially in the early morning. One writer tells of shooting a male bird, which lay on the ground fluttering in its death struggles, when a second cock kaleege dashed out of the jungle near by and attacked the dying bird with the greatest fury, although the sportsman was standing close at hand.

The drumming with the wings, which I have already mentioned, is heard chiefly in the early part of the breeding season, and from observation there is no doubt that it is a warning or challenge to other males within hearing. It has been well compared to the rapid shaking in the air of a piece of stiff cloth. We have certain proof that it is merely a defiance, and not a call to attract the females, by observing the result of the native trapping in Burma with a decoy male of one of the allied pheasants of this genus. In this case, male after male replies to and rushes at the drumming bird, but no female is ever thus enticed within reach of the snares.

In regard to this drumming Baldwin says, "We had been sitting motionless for, I suppose, half-an-hour, when I was startled, all of a sudden, by the loud drumming noise I have already described, close at hand. The sound came from behind, and on looking over my shoulder, my companion, with a smile, pointed out the drummer. An old cock kaleege was squatting on the stump of a fallen tree, and with its feathers all ruffled and tail spread, was causing this extraordinary sound by rapidly beating its wings against its body." This latter assertion is an error, corresponding to the long controversy which waged about the method of production of the drumming of the American ruffed grouse: whether by beating against a hollow log, or against the inflated sides of its own body, or merely by the impact of the wings upon the air. The latter was soon found to be the sole method, and the same is true of the White-crested Kaleege, and indeed of all the members of this extensive group of *Gennaeus* pheasants.

I have seen several of them drumming in a wild state, and all of the more commonly kept captive species, and the method never varies. The bird stands rather erect, with head and neck stretched out, and with a single motion raises and half opens its wings, and imparts to them so rapid a vibration that they seem but a grey haze against the body. There is never any question of their touching the body—the hazy arc is not of wide extent—somewhat less, in fact, than the corresponding phenomenon in the ruffed grouse—and its limits are very distinctly outlined. The sound is produced by the air rushing through the tensely-strung flight feathers. As I shall have occasion elsewhere to relate, the drumming sometimes has a remarkable ventriloquial quality, and is most difficult to locate. The sound is a deep, resonant *woof-woof-woof-woof!* sometimes drawn out into a reverberating, drum-like roll, *woof-r-r-r-r-r-r-r-woof!*—a sound which is like an electric shock to the lover of the wilds where these birds live. I cannot believe that the same sudden leap of pulse and thrill of joy at the sound is as keen in the sportsman, to whom its chief import is the hope of a shot, as when it stands chiefly for the sheer joy of life in the wilderness and the excitement of close association with all these splendid wild creatures.

The statement that the drumming is heard only at the breeding season is not quite true, although there is no doubt that its real function is performed at that period. But very rarely, even in the autumn or winter, when a cock bird is suspicious of danger and yet has neither seen nor heard anything definite—at that moment of inexplicable keenness, when some psychological sense of which we as yet know nothing makes the bird *feel* that all is not right, the bird will sometimes drum, almost or quite silently. The feathers are apparently held loosely, their edges pliant or separated, for while the wings vibrate as rapidly as ever, yet no sound comes forth. I have observed this several times, and in more than one species. The impulse in such a case is probably purely nervous and unconscious. The bird is tense, every sense on the alert, knowing that all is not right, yet with no hint of the character or direction of the danger, and as yet unwilling, and knowing not in what direction, to flee. Fear not yet predominating, impatience and suspicion produce an irritated, unsettled state of mind which impels it to resort to the challenge action, but, tempered with caution, the action alone is manifested, the sound is repressed. If I have read the bird's emotions aright—and such explanation seems well within the mental plane of the pheasant—it shows an interesting correlation of widely separated seasonal activities with a passing, transient emotion.

The nest itself, like that of most pheasants, is scarcely worthy of the name, although in some instances there seems a decided attempt to gather materials. This usually takes the form of a slight pad or mat of dead leaves, fine grass and moss, and in a depression in the centre the eggs are laid. In one instance, where the bird had gathered a greater quantity of debris than usual, the nest measured nearly a foot across, four inches deep outside, while the central depression was six inches wide and nearly two inches deep. When the ground is covered with a thick carpet of dead leaves, no additional matter is gathered, or again, where a slight hollow, either natural or scratched in the ground by the birds, is utilized, a mere lining skin of grass or leaves is present. The situation of the nest is varied, and conforms only to very general requirements. The more usual locations are as follows :

1.—Placed under the shelter of tufts of large, overhanging ferns ; coarse, tall grass, or the slender dwarf ringal or hill-bamboo, on rather open hillsides.
2.—Among sapling growths with plenty of underbrush, close under the shelter of an overhanging stone, thick, low bush or tuft of grass.

One unusual situation is noted by Captain Cock, who says that the eggs are laid, "as a rule, on the ground under a rock or bush ; but I have taken a nest on a large bough of a tree, in a hollow on the upper side of which the eggs were placed." There seems absolutely no significance in this as hinting of a tendency toward arboreal habits like those of the Tragopans, as the *Gennaeus* group of pheasants is essentially a terrestrial one in every way.

The experience of many observers shows that the number of eggs ranges from eight to fourteen, with the more usual number about nine. The hen incubates for a period of about twenty-six days, and during this period her dependence upon her leaf-brown coloration is almost absolute. A dog may approach, and detect her, not by scent, but by blundering upon the sitting bird, and may seize her before she will leave. Several writers and sportsmen testify to having approached with great care and actually placed their hand upon and caught the hen as she sat rigid—held to her home by her mother love, a performance, let us hope, which was followed by the setting free immediately of the too-trusting bird. The fact is of great interest, however, as emphasizing the unconscious faith which the bird places in its hues of brown and buff. The cock bird is never far away, and when the hen is threatened by a dog or other animal, the male will fly into a tree and cackle loudly.

At the end of the long period of incubation the chicks emerge, escaping through the neatly-severed top of the egg, and leave the nest almost at once. When the brood leaves the vicinity, the male at once attaches himself to his family, and during the period of growth of the chicks the two parents are invariably found close together with them. Later, when the wings of the young birds allow them to fly up into the branches, the entire family roosts together in the same tree, and not until the birds of the year are full-sized do they drift apart from their parents and begin to forage for themselves. It is now that the young pheasants of several families seem to feel a drawing toward one another, and although they usually roost singly, they may often be found feeding together or working through the undergrowth in company in the daytime.

Unusually late broods which have been observed are unquestionably due to the first nest having been destroyed by hail or monkeys or some other agency, and not to the fact that this pheasant ever rears two broods in one season.

The eggs are regular ovals, only moderately elongated, and quite pointed at one end, bearing in shape a closer resemblance to the eggs of the European partridge and peahen than to those of the common pheasant. The shells are glossy, some specimens more so than others, and the surface is generally very closely and finely pitted with minute pores, like those of the peafowl's egg. Occasionally these will be conspicuous, but usually very close inspection is necessary to observe them. There is considerable variation in colour, from pale creamy or buffy white to a warm, rich, reddish buff. They are wholly unmarked, except that it is not rare to find small dots of white lime occurring irregularly here and there on the shell. The eggs measure from 46 to 52 mm. in length, and from 31 to 39 in breadth.

CAPTIVITY

As regards the White-crested Kaleege in captivity, the first record of the species breeding seems to be in the London Gardens in 1859, although a bird deposited eggs in the same institution two years earlier. The birds lay quite readily, and the chicks are no more difficult to rear than those of allied species. The adult birds live well, the average life of twelve individuals being three years, while one individual lived six years and four months.

DETAILED DESCRIPTION

Adult Male.—From the occiput springs a long, hairy, greyish-white crest, sometimes reaching the length of 110 mm. These feathers are normal in character and dark brown in colour for a short distance at their base—as long as the aftershaft—and then the white colour appears and the barbs become very scanty and exceedingly elongated, and for the distal four-fifths no shaft is distinguishable, the plume being composed of fifteen or twenty filamentous, hair-like barbs.

The remainder of the crown and neck all around, mantle, back, scapulars, wing-coverts, rump and tail-covets are brownish black, shading into a metallic purple and steel-blue gloss on the visible parts of the feathers. Entire mantle and scapulars with each feather terminally edged with whitish. Posteriorly the mantle tends to show an excess of the basal dark brown and a diminution of the metallic gloss. Entire back and rump with a very broad terminal white fringe, averaging 7 mm. in breadth. The longer upper tail-coverts are very narrowly margined with white.

In typically patterned, fully adult birds the feathers of the wings are almost unmarked, the invariable exception being the tertiaries, or inner secondaries, which are conspicuously mottled along the terminal border with white. The green-glossed wing-coverts are often edged with purplish. The secondaries are glossed only on the outer web, and the primaries are uniformly dull brown, their coverts being darker. The tail is black, glossed with purplish blue.

Sides of the face, chin and throat dull brownish black. The narrow glossy band on the lower throat gives place quite abruptly to the long, greyish-white lanceolate plumage of the lower parts. The dark brown basal portions are ill-concealed on account of the narrow, tapering character of the feathers, and the glistening white shaft is conspicuous even on the pale distal portion. Posteriorly the basal brown increases, until the flanks and under tail-coverts are quite brownish black, with only faint indications of whitish at the tips. The under tail-coverts are strongly glossed with greenish.

Bare facial and loral area scarlet, covered with numerous elongate finger-like papillæ and dotted sparingly with minute degenerate featherlets, these being especially abundant on the lower eye-lid. Irides warm hazel brown. Mandibles pale greenish horn colour, darker at the base. Legs and feet rather variable, drab grey to pale whitish, usually more or less tinged with brown or olive. Weight 2 lbs. to 2 lbs. 6 ozs.

Length, 608 to 735 mm., averaging 670; extent, 730 to 800; bill from nostril, 19 mm.; wing, 220 to 250; tail, 250 to 330; tarsus, 75; middle toe and claw, 60; spurs, straight and rather slender, 15 mm.

Variation.—The variation in the plumage of the adult male of the White-crested Kaleege is of special interest, because of the geographical position of the species. It is at the extremity of the westward, finger-like extension of the kaleege pheasants along the southern slopes of the Himalayas. Thus, unlike its allies, which are found in intermediate positions, the White-crested Kaleege can have affiliations in only one direction and with but a single species, the Nepal kaleege (*G. leucomelanus*). While variation is present and is quite strongly pronounced yet it points to no indication of incomplete separation or of present crossing between the two species. Again, this variation is as apparent in specimens from the extreme west as from those of the eastern part of the range. There is no gradation as the two species approach one another, such as we find so clearly in the koklass pheasants (*Pucrasia*) of this same region.

The variation is in part and very subordinately individual when it is persistent throughout life, but on the whole it is due to age. A few of the most persistent characters hark back through all the present kaleege plumages to a more primitive patterning, such as is to-day found in Burmese and Chinese members of the genus. The whitish vermiculation of the central tail-feathers is worthy of mention here, as it persists in very old individuals, strongly developed, not only on the extreme concealed basal portions, but occasionally well up toward the centre of the feathers, beyond the longest tail-covert. The other variations are detailed in the description of the first-year male plumage.

Adult Female.—The long occipital crest is brownish grey in colour, and less specialized than in the male. It is shorter, seldom over 70 mm. in length, and the vane, while very narrow, is normally feather-like throughout. Upper body plumage cold reddish brown, the feathers of the crown, neck, mantle, back and rump conspicuously edged with grey. The reddish hue increases in intensity posteriorly, and from the mantle backward is finely vermiculated with black. On the wing-coverts the margins are decidedly white, forming distinct tranverse bars across the wing. The flight-feathers are vermiculated only on the exposed portion of the outer webs, the remainder being brownish-black.

The middle pair of tail-feathers is black, thickly vermiculated with reddish or rufous, these wavy lines becoming paler and coarser on the inner webs. Traces of this reddish vermiculation are found on the external margin and tips of the next two or three pairs, the lateral rectrices being otherwise black, strongly glossed with green on the outer web. Chin and throat whitish, shading gradually into the warm reddish brown of the lower plumage, the black vermiculation being less distinct than on the upper plumage, but with conspicuous and wide margins of white.

Facial skin scarlet, with a scattering of minute black featherlets. Bill yellowish or greenish horn, darker basally. Irides hazel. Legs and feet brownish, sometimes very pale. Claws black. Weight, 1 lb. 6 ozs. to 2 lbs. Length, 500 to 730, averaging 600 mm.; extent, 620 to 680; wing, 225; tail, 210; tarsus, 67; middle toe and claw, 55; bill from nostril, 17 mm. The spurs in the female are sharp, slightly elevated scalules.

Chick in Down.—The crown is "chocolate brown, with the sides of the head and crown rufous, pale on former, rich and somewhat chestnut on the latter; ear coverts dark brown; upper plumage brown, minutely freckled with black, each feather with paler edging, a conspicuous white spot at the tip, and a broad sub-terminal bar of black edged with rufous; wing-coverts like the back. Lower plumage dull pale brown, the feathers with whitish shafts and pale edges."

Juvenile Plumage.—The juvenile plumage is of a very indefinite buffy brown, indistinctly mottled with blackish, darker, more greyish above, paler brown below. Most of the mantle feathers and all of the wing-coverts have a broad terminal band of pale brownish white, and a still wider sub-terminal cross bar of black, one of the most characteristic juvenile marks of this genus. The sexes are distinctly marked in the juvenile plumage, the males being much darker and the females more of a rufous, reddish brown.

First Year Male Plumage.—As in all the members of this genus, the young bird moults directly from the juvenile garb into the adult plumage. There is, however, much variation in these first year's feathers, owing to the advanced or retarded condition of pigment formation in the blood of each individual. I have known of instances where the moult resulted in fully adult patterns and coloration, where the crest was almost as white as it is ever found, and where the wings appeared metallic and unmarked. In two of these cases the birds were in captivity, well nourished by an abundance of food, but the moult retarded by unseasonable cold weather. The changes in the blood were therefore apparently completed, and the transition from immature to fully mature was clean and abrupt.

On the other hand, in both wild and captive individuals we often find a partial assumption of adult patterns at this moult, although this is apparent only in more or less inconspicuous characters—which, however, are full of significance and interest.

The most noticeable of such characters are the absence, or extremely poor development, of metallic gloss on the plumage, and the presence of whitish vermiculation on the wing-coverts, secondaries, upper tail-coverts and tail-feathers. The mantle shows the absence of gloss more commonly than other parts of the plumage. The entire exposed outer webs of the greater coverts and secondaries are sometimes thickly vermiculated with pale brown during the first year of the bird's life, and the same is true of the three or four middle pairs of tail-feathers, except that in this case the vermiculations are greyish white and much coarser. As I have said, this character occasionally persists even in very old individuals.

The young female in first-year plumage closely resembles the adult. The most constant differences are a richer, more rufous red of the plumage in general, thus approximating the Nepal kaleege, and a greater extent of white in the under plumage.

SYNONYMY

Phasianus hamiltonii Gray, in Griff. ed. Cuv., III. 1829, p. 27; id. Ill. Ind. Zool., I. 1830–32, pl. 41.

Phasianus albocristatus Vigors, Proc. Zool. Soc. London, 1830, p. 9; Vigors, Proc. Zool. Soc. London, 1832, p. 16; id. Phil. Mag., 1831, p. 60; Gould, Cent. Birds Himal., 1832, pls. 66, 67 (text); Vigne, Proc. Zool. Soc. London, 1841, p. 6 (Alpine Punjab); Stewart, Zoologist (3), X. 1886, p. 321.

Gennaeus albocristatus Wagl. Isis, 1832, p. 1228; Grant, Cat. Game-birds, XXII. 1893, p. 298; Grant, Handbook Game-birds, I. 1895, p. 258; Nehrkorn, Katalog der Eiersammlung, 1899, p. 193; Rothschild, Bull. Brit. Orn. Club, XIV. 1904, p. 58; Beebe, Zoologica, I. No. 17, 1914, p. 320; Baker, Jour. Bombay Nat. Hist. Soc., XXIII. 1915, p. 666; Baker, Jour. Bombay Nat. Hist. Soc., XXV. 1917, p. 164.

Euplocomus leucomelanos Gray, List of Birds, 1844, pt. III. p. 25 (part).

Euplocomus leucomelas Hodgs. in Gray's Zool. Misc., 1844, p. 85 (part no. 80 ♀); id. Icon. ined., in Brit. Mus. Gall. pl. 14, no. 80 ♀.

Euplocomus albocristatus Hutton, Jour. As. Soc. Bengal, XVII. 1847, pt. 2, p. 693; Irby, Ibis, 1861, p. 235 (Kumaon); Adams, Wanderings of Naturalist in India, 1867, p. 92; Blyth, Cat. Mus. As. Soc., 1849, p. 244.

Euplocamus albocristatus Adams, Proc. Zool. Soc. London, 1858, p. 499 (Simla, Cashmere); Sclater, List of Phas., 1863, p. 9; Gray, List Gallinae Brit. Mus., 1867, p. 32; id. Hand-list Birds, II. 1870, p. 260; Elliot, Mon. Phas., II. 1872, pl. 18 (syn. part); Garrod, Proc. Zool. Soc. London, 1873, pp. 468, 640; Hume and Inglis, Stray Feathers, V. 1877, p. 42; Hume and Marshall, Game-birds India, I. 1878, p. 177, pl.; Sclater, List Animals in Garden, Zool. Soc. London, 1883, p. 487; Marshall, Ibis, 1884, p. 423 (Chamba); Tegetmeier, Pheasants, 1904, p. 227; Oates, ed. Hume's Nests and Eggs, III. 1890, p. 413; Evans, Ibis, 1891, p. 77; Mitchell, Proc. Zool. Soc. London, 1911, p. 522.

Gallophasis albocristatus Mitchell, Proc. Zool. Soc. London, 1858, p. 544, pl. 148, fig. 1 and pl. 149, fig. 3; Adams, Proc. Zool. Soc. London, 1859, p. 186; Jerdon, Birds India, III, 1863, p. 532 (part); Blyth, Ibis, 1867, p. 153; Tytler, Ibis, 1868, p. 203 (Simla to Mussoorie); v. Pelzeln, Ibis, 1868, p. 321 (Koteghur); Beavan, Ibis, 1868, p. 380 (Simla); Brooks, Ibis, 1869, p. 60 (Baini Tal, Almorah); Hume, N. & E. India Birds, 1873, p. 526; Marshall, Birds' Nests India, 1877, p. 59; Scully, Stray Feathers, VIII. 1879, p. 346; Leverkühn, Jour. für Orn., 1890, p. 195.

Gennaeus albicristatus Blanford, Fauna Brit. India, Birds, IV. 1898, p. 89; Oates, Game-birds India, I. 1898, p. 324; Sharpe, Hand-list Birds, I. 1899, p. 35; Oates, Cat. Birds' Eggs Brit. Mus., I. 1901, p. 54; Rattray, Jour. Bombay Nat. Hist. Soc., XVI. 1905, p. 663 (Nesting at Murree, 6000 feet); Ward, Jour. Bombay Nat. Hist. Soc., XVII. 1907, p. 244 (absent from Kashmir vale; found in Murree Road and Kishtwar); Magrath, Jour. Bombay Nat. Hist. Soc., XVIII. 1908, p. 298 (Thandiani, Hazara); Ghigi, Mem. Acad. Bologna (6), V. 1908, p. 145; "Pine Marten," Jour. Bombay Nat. Hist. Soc. XIX. 1910, p. 797; Magrath, Jour. Bombay Nat. Hist. Soc., XVIII. 1908, p. 298.

Euphocanus albocristatus Anderson, Jour. Bombay Nat. Hist. Soc., IV. 1889, p. 59.

NEPAL KALEEGE

Gennaeus leucomelanus (Latham)

NAMES.—Specific: *leucomelanus*, from Greek *λευκός* white, and *μέλας* black. English: Nepal Kaleege Pheasant. Native: Kalich or Kalij (Perbuttia), Rechabo (Bhutia), Nepal.

BRIEF DESCRIPTION.—Male: Similar to the white-crested kaleege (*G. albocristatus*), but with the crest somewhat shorter and bluish black instead of whitish, and the white fringe on the feathers of the back and rump narrower. Female: Differs from most females of the white-crested kaleege in being generally darker, especially below where the ground colour of the plumage is dark reddish brown.

RANGE.—Nepal.

GENERAL DISTRIBUTION

ELSEWHERE I have discussed the standing of this bird, and here need only emphasize the fact that the Nepal Kaleege is a perfectly well-marked species. Although showing a certain amount of variation, there is no indication of true hybridization with neighbouring species.

This is emphasized by its range, which is quite distinct. It does not reach the Arun River, in the eastern part of Nepal, and does not appear to have been taken west of Jemlah, in the extreme west of the state. In the Dun of south Nepal it is found well down in suitable localities and northward to about mid-Nepal. Altitudinally it probably seldom exceeds an elevation of nine thousand feet. Its entire range may thus be included in a long, narrow rectangle of about three hundred and fifty by fifty miles.

GENERAL ACCOUNT

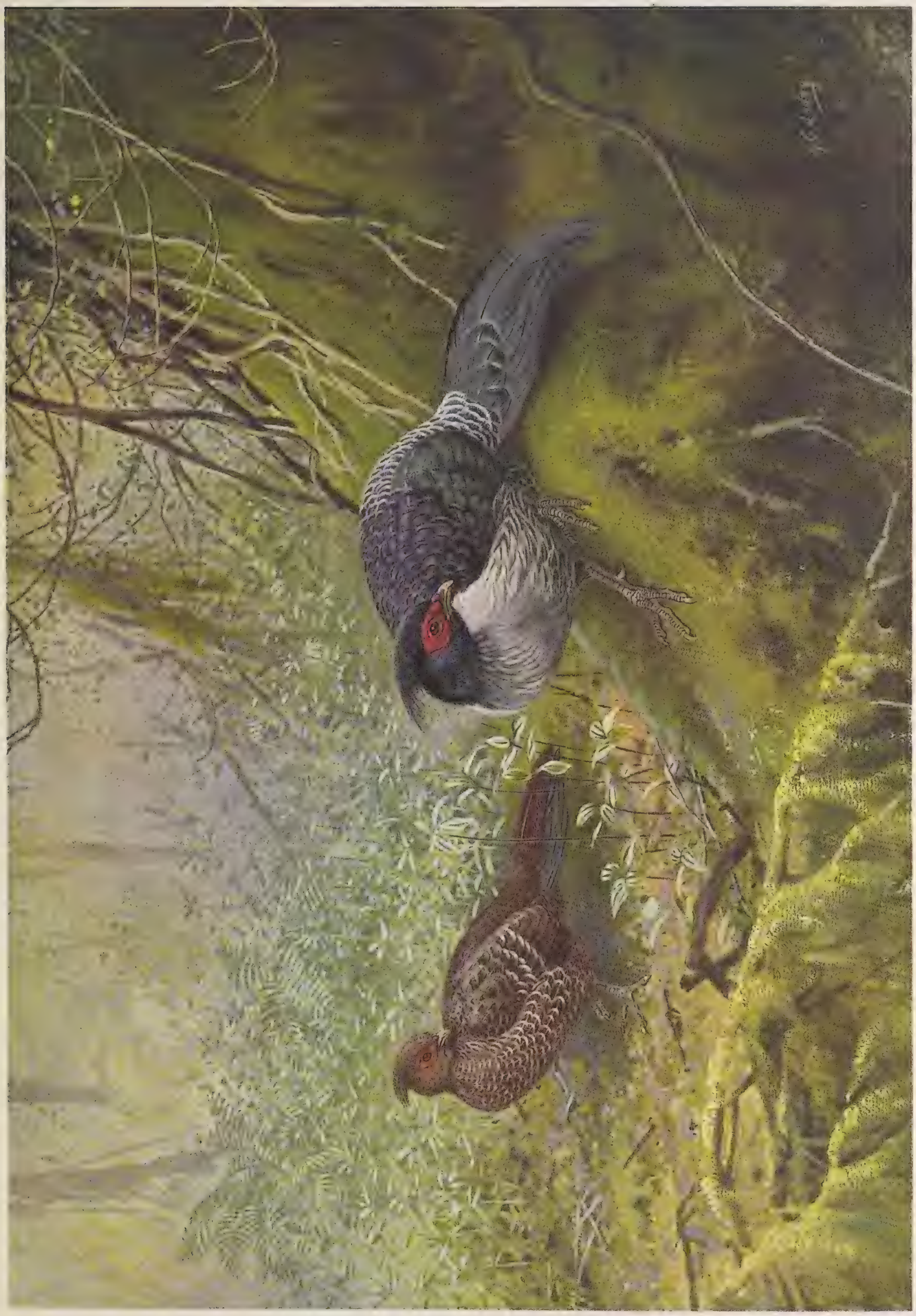
To the west of Nepal I had watched and studied the white-crested kaleege in the oak forests of Garhwal; east of Nepal many days were spent in the moss-hung jungles where the black-backed kaleege lived, but because my skin was fair, not yellow; because my eyes had not that slight Mongolian slant which marks the Ghurka or native Nepalese, I was never able to see in life the Nepal Kaleege. For this bird keeps well within the boundaries of this sturdy little kingdom, and no Caucasian is permitted to enter its maze of tumbled mountain ranges. The one exception is the solitary Englishman who acts as Government agent at Khatmandu. But even he may not leave the vicinity of this particular valley. It is upon the specimens and facts obtained by these agents that we must base our meagre knowledge of this kaleege, which, however, appears to differ in no particular, in its general mode of life, from its allies to the west and to the east.

By the courtesy of the late Maharaja of Nepal, I was able to obtain several recently killed pairs of these birds, which furnished data as to plumage and food.

NEPAL KALEEGE

Gennaeus leucomelanus (Latham)

No white man has ever seen this bird in its native haunts, for it is confined to the southern part of Nepal, where no Caucasian is admitted. It lives in the moss-hung oak and spruce forests which cover the maze of tumbled mountain ranges of this little kingdom, and is trapped wholesale by the Nepalese shepherds.



NEPAL KALEEGE.

The crops of two of these pheasants contained the following food:

Male: 3 flat seeds; 1 long stem of a fern; many small leaves.

Female: 20 termite workers; 1 large black ant; 1 small mollusk; 12 fruits of *Eurya* sp.; several unknown seeds and berries; numbers of leaves.

A female shot on May 31 would shortly have laid at least four eggs.

Scully says that these kaleege are fond of thick forest and are "usually seen in pairs or in parties of from three to ten, often feeding on the ground near cultivated patches at the borders of forest."

"These birds seem very fond of perching on trees, and it is usually in this position that one comes across them in forcing one's way through forest which has dense undergrowth. On such occasions the kaleege first gives notice of its whereabouts by whirring down with great velocity from its perch, and then running rapidly out of sight to the shelter of some thicket. In the winter the birds roost on trees at the foot of the hills, and the plan for making a bag is to post oneself about sunset under some trees which they are known to frequent, and await their coming. The birds are then soon heard threading their way through the jungle towards their favourite trees, and at once fly up and perch. When once settled for the night in this way they are not easily alarmed, and I have shot four or five birds in quick succession before the rest of the party would clear out to quieter quarters. Occasionally, too, one can get a shot at the kaleege as they cross a hill-path through the forest on their way to or from some stream.

"Great numbers of the Nepal Kaleege are snared and brought into Khatmandu for sale. The birds bear confinement in the valley very well, and I reared several chicks to maturity."

The subject of the validity of the Nepal Kaleege as a distinct species may be summed up in a few words. More than fifty-five years ago ornithologists were inclined to admit but a single kaleege. Later, two were allowed, and Blyth added another, but was convinced that the Nepal bird was a hybrid between the white-crested and black-backed kaleege.

Now, however, that we have abundant material and more certain knowledge of the range of these birds, we can say with certainty that there are four well-defined species of kaleege extending along the southern slopes of the Himalayas and forming a linear series stretching from Kashmir to Burma, where the genus spreads out into the wonderfully interesting and puzzling series of wild hybrids marking the transition into the lineated kaleege and the silver pheasants.

DETAILED DESCRIPTION

Adult Male.—A long, hairy crest, as in the white-crested kaleege. Upper plumage in general black, with a strong metallic gloss. This is deep steel-blue on the crown, crest and neck, while the mantle, back and rump show considerable purple, and the wing-coverts and secondaries are predominately green. The shafts of the mantle and back are white. Mantle, scapulars, some of the tertiaries and long upper tail-coverts very slightly fringed with white, usually in the form of a scanty mottling. This increases on the back and rump, where it forms a solid fringe of white, about one-half as wide as in *G. albocristatus*.

Tail-feathers black, glossed with purplish green, and with the one or two middle pairs more or less vermiculated with buff. Chin, throat and ear-coverts dull black. Under-parts of greyish white; lanceolate feathers usually darker than in *albocristatus*, the basal dark brown being much more in evidence. Abdomen and flanks dull blackish brown, the under tail-coverts glossed with green.

Facial skin scarlet, rather thickly dotted with minute featherlets. Irides dark hazel. Bill greenish horn colour, dusky at base of culmen and around nostrils. Feet brownish grey; spurs dusky. Weight 1 lb. 12 ozs. to 2 lbs. 4 ozs.

Length, 580 to 660 mm.; expanse, 660 to 750; wing, 220 to 235; tail, 240 to 280; tarsus, 72; middle toe and claw, 60; bill from nostril, 18.

Adult Female.—Rich warm brown, with the feathers tipped with greyish white on the upper plumage, and more widely with white below. Upper plumage from the mantle backward, including wings, finely vermiculated with black. The rump and upper tail-coverts contrast with the central tail-feathers in being of a lighter, more buffy brown, the vermiculations of the latter being predominately rufous on the outer, and paler buffy white on the inner webs. Otherwise, as in the female of *albocristatus*. Weight 1 lb. 6 ozs. to 1 lb. 12 ozs.

The colours of the eye and fleshy parts are the same as in *albocristatus*. Length, 480 to 510 mm.; expanse, 630 to 680; wing, 210; tail, 200; tarsus, 65; middle toe and claw, 56; bill from nostril, 17.

The female Nepal Kaleege has, on the whole, the vermiculations of the middle tail-feathers less coarse than in *albocristatus*, while the grey margins of the upper plumage are broader than in *melanonotus*. In the series of perfectly fresh skins of the three species, *leucomelanus* is intermediate in general tone of brown colouring, *albocristatus* being paler and *melanonotus* darker. Elsewhere I have described how radically the skins of these birds change in time, so that this distinction seems to be lost in museum skins.

Chick in Down.—The only information we have of a wild caught Kaleege of this age, is the description given by Dr. Scully of a chick captured in Nepal on June 10. The wing-feathers were just sprouting, and measured 50 mm. in length. Head rufous brown, body above dark brown, below buff. Each feather of the new juvenile scapulars and wing-coverts had a buff tip and a sub-terminal black bar. Legs and feet orange; bill greenish-yellow horn.

Juvenile Plumage.—Young birds of three months resemble the female in general, with the bill pale at the tip, the facial skin pale fleshy red and the legs and feet pale brown. In this plumage the black sub-terminal bars on the upper plumage are the most conspicuous character.

First Year Plumage.—The adult plumage is assumed at the age of about five months, but traces of the juvenile brown often remain on many of the new feathers of the upper plumage and wings.

EARLY HISTORY

Under the name of Coloured Pheasant, Latham mentions this bird as early as 1787, and three years later he gives it the title *Phasianus leucomelanus.* Jerdon confused it with *albocristatus*, but its occurrence in ornithological literature has been rare, and even to-day we know but little of its haunts or habits, owing to the complete isolation and restriction of its native country of Nepal.

SYNONYMY

Coloured Pheasant Latham, Gen. Syn. Suppl., I. 1787, p. 210; id. Gen. Hist., VIII. 1832, p. 203.

Phasianus leucomelanos Latham, Ind. Orn. II. 1790, p. 633; Bonnat. Tabl. Encycl. Meth. I. 1791, p. 189; Temn. Pig. et Gall., II. 1813, p. 353, III. 1815, p. 670; Viellot, N. Dict. d'Hist. Nat., XI. 1817, p. 40; Vigor, Proc. Zool. Soc. London, 1832, p. 16.

Nepaul Pheasant Latham, Gen. Hist., VIII. 1823, p. 202.

Euplocomus leucomelanos Gray, List of Birds, Pt. III. 1844, p. 25 (part).

Euplocomus leucomelas Hodgs. in Gray's Zool. Misc., 1844, p. 85; id. Icon. ined. in Brit. Mus. Gall., pl. 14, fig. 79.

Gallophasis leucomelanos Gray, Genera Birds, III. 1845, p. 498; id. Cat. Hodgs. ed., I. 1846, p. 124; Hutton, Jour. As. Soc. Bengal, XVII. Pt. 2, 1848, p. 694.

Gallophasis albocristatus Jerdon, Birds India, III. 1863, p. 532 (part).

Euplocomus leucomelanos Gray, List Gallinae Brit. Mus., 1867, p. 33; id. Hand-list Birds, II. 1870, p. 260.

Euplocamus leucomelanos Hume, Stray Feathers, VII. 1878, p. 428; Hume and Marshall, Game-birds India, I. 1878, p. 185, pl.

Gallophasis leucomelanus Scully, Stray Feathers, VIII. 1879, p. 345 (Nepal).

Gennaeus leucomelanus Grant, Cat. Birds, Brit. Mus., XXII. 1893, p. 300; Grant, Hand-book Game-birds, I. 1895, p. 262; Oates, Man. Game-birds India, 1898, p. 329; Blanford, Fauna Brit. India, Birds, IV. 1898, p. 90; Donald, Jour. Bombay Nat. Hist. Soc., XII. 1899, p. 577 ?(Kashmir); Sharpe, Hand-list Birds, I. 1899, p. 35; Beebe, Zoologica, I. No. 17, 1914; p. 320; Baker, Jour. Bombay Nat. Hist. Soc., XXIII. 1915, p. 667; Baker, Jour. Bombay Nat. Hist. Soc., XXV. 1917, p. 172.

BLACK-BACKED KALEEGE

Gennaeus melanonotus (Blyth)

Names.—Specific: *melanonotus*, from the Greek *μέλανο* (from *μέλας*) black, and *νῶνος* back. English: Black-backed, Black-headed or Sikhim Kaleege Pheasant. French: Euplocome melanote. German: Schwarzrückenfasan. Native: Karrik-pho (Lepcha) Sikhim; Kirrik (Bhutea); Muthoora (Bengali).

Brief Description.—Male: Resembles the male of the Nepal Kaleege (*G. leucomelanus*), but with no white terminal fringe to the feathers of the upper plumage; these feathers are also highly glossed, the wings with green, the back with steel-blue. Female: Resembles the female of the Nepal Kaleege, but is still darker, the dark red becoming more of a dark brown or black, and the light tips of the feathers thus appearing clearer white.

Type.—♂ Marked Sikhim, G. B. Mainwaring; ♀ and juv. marked Sikhim, A. S. B. (E. Blyth). In the Indian Museum, Calcutta.

Range.—Native and British Sikhim and Western Bhutan.

THE BIRD IN ITS HAUNTS

The terrible silence of fear closed down upon the jungle. A myriad creatures breathed, panted or held their breath, while a laughing thrush voiced its terror in a wild outburst of shrieks, as it fled headlong. For several minutes the moss-hung forest gave forth not a whisper of life. Only the slow flapping of great butterflies showed that any living thing still existed within its shadows.

I lay prone upon a huge flat-topped boulder on a bed of damp moss, and here the laughing thrush had flown down and alighted close to my shoulder. Startled for the moment, I turned suddenly, with the result I have related, of sending the thrush into a frenzy of fear and of silencing every creature within earshot.

The Sikhim jungle around me was the home of the Black-backed Kaleege, and from earlier scouting I knew that at this moment there were several pairs within a few hundred yards, and a nest of these pheasants within a still shorter distance. The particular day of which I write was a brilliant one in early spring, but in these mid-Himalayas the air was cool and, although it was high noon, scarcely a ray of sunlight penetrated to where I lay upon the floor of the jungle. Even when the alarm of the frightened thrush had passed, the woods lay quiet, with only the distant sibilant tones of the tiny bush-warblers.

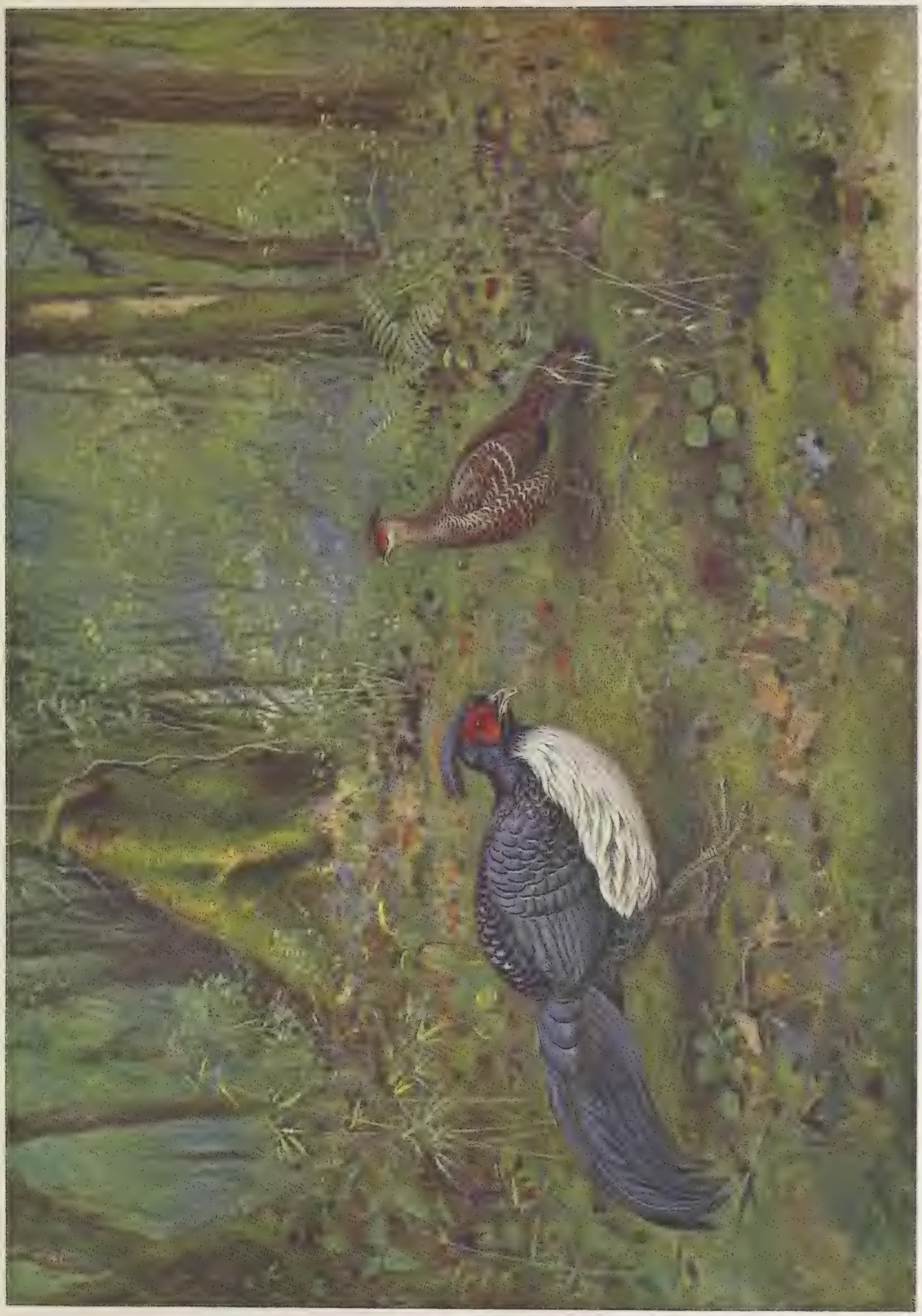
From base of trunk to topmost twig, every tree was draped with a thick coat and with pendants of moss—long, streaming tassels of green and brown, which softened every outline, emphasized every knot. The tiniest two-leaved shoot, just broken from its acorn, bore its burden of fairy filament, which would increase as the plant grew, asking no sacrifice of sap or light, but only a support upon which the moss could ripen its lowly spores and whence it could with wider vantage shed them abroad.

My great boulder jutted out from the jungle floor, lichen-painted and moss-softened and for ever shadowed by the dense foliage overhead. Before me seven great oaks

BLACK-BACKED KALEEGE

Gennaeus melanonotus (Blyth)

Deep in the mossy, humid forests of Sikhim I have watched a pair of these pheasants picking among the fallen leaves, and murmuring to each other in low musical tones. Later the hen made her way to her nest among the ferns at the base of a great tree, and the cock mounted slowly, branch by branch, to a lofty perch, and night settled quietly down over the Himalayan wilderness.



BLACK-BACKED KALEEGE.

encircled a little sombre glade, all leaning slightly toward one another as if met in some intimate solemn conclave. A checkering of twilight sifted through their green, swaying curtains, and now and then a shining drop of moisture fell from some moss stalactite, glistened for a moment as it passed through a ray of light, and silently vanished as it struck the sponge-like carpet of the glade. Just beneath me this carpet was variegated with tufts of graceful ferns, while tangled among the moss filaments of the boulder were masses of acorn conglomerates—a dozen great caps grown together, some still filled with fruit, others empty—gone to fulfill their destiny, whether it be in the fulness of time to bring into being an oak to replace these giants, or to be crunched by a passing bear or swallowed by pheasant or jay. In the interstices of the boulder's steep sides, clinging to scanty bits of black mould, stood little jacks, much like the jacks-in-the-pulpit of our American woodlands, but gay with stripes of maroon and pink.

As I lay among such surroundings, hoping for a view of some of the jungle inmates, the dim light occasionally grew more dim—still more diffuse. Then there reached my ears the indistinct murmur of wind through moss, and following a sudden shower of drops from the saturated foliage, there came through the glade billow after billow of cloud, faintly veiling the jungle vista with blue. It had come down the valley from the snows high overhead. From the glaciers it brought a cold, humid chill, but on its way thither it swept through the higher forests of magnolias, and from the great swaying blossoms on the mountain sides a mile or more above me, and many miles distant, it gleaned a burden of perfume, and now the air of the glade about me was saturated with the sweetness.

As quickly as it came, the chill wind passed, the clouds sifted onward through the waving moss and the sun shone out, bringing a new wave of warmth from the valley below which penetrated even to my damp couch.

A long, low mound in the furry carpet marked a tree, fallen years ago, and now, rotten and giving of its substance to nourish its children sprouting on all sides. Suddenly above this appeared the small, trim head of a hen pheasant. She reached up snatched an insect from a twig, scanned the glade for a moment and disappeared. The ferns closed over her, and once, a few feet farther along the log, a fern trembled for a moment as she brushed against it. In a few minutes I knew she must be safely ensconced on the seven eggs which I had already located close to the distant end of the fallen tree. There for the remainder of the afternoon she sat closely—patiently warming the chicks into life—her mottled plumage one with the browns of moss and sodden leaf.

A dainty green-backed titmouse flew to a twig on a level with my eye and, filled with the joy of spring, burst into song. He raised his crest, threw back his head and shouted *cheep-a! cheep-a! cheep-a! cheep-a!* again and again. No answer came, but he did not lose heart. He had another song in his humble repertoire, and suddenly he changed to a high, metallic *heep-heep! heep-heep! heep-heep!* trembling with emotion the while. Surely if any lady titmouse was within hearing, she could not but be moved! Far up among the foliage many small birds were twittering, and some distant note seemed to carry a meaning to him, for after a moment of listening he was off like a shot.

Then two more Himalayan lives touched mine for a moment of time, to diverge for ever almost at once—and two as different as one could imagine. A yellow-backed sunbird appeared before me, as suddenly as if from the clear air, as beautiful as if from some unknown fairyland. Perched in a glow of sunlight almost within arm's reach, the feathered atom was ablaze with metallic colour—from its beak to toe one's eye registered green, maroon, olive, bright yellow, green and black, while its breast was of brightest lemon stained with crimson. A shuffling among the ferns drew my eyes away and slowly there lumbered past, seen dimly beyond one side of the glade, a half-grown bear. The black beast made no commotion, pushing quietly through the under-brush and soon passing from view. When I looked back the sunbird, too, had vanished. Although the bear never crossed my path again, it was far different with the hen Kaleege, as I had occasion to discover a few days later.

The rest of the afternoon passed quietly, although I once had a thrill when two deer came close to me and crossed the glade, with many stops for a nibble at fern-top or moss. One was rufous, one was brown, a sambur doe and nearly grown fawn. Their eyes were lustrous, and together with their ears and nostrils never for an instant ceased their vigilant watch for danger. I was hidden and above reach of scent, but not a rustle of squirrel or bird but was noticed, not a movement of shadow or quiver of mossy bough but was tested with sight and scent and hearing. Their life seemed one great fear—one never-ending watch for death. And here was I, the type of the most terrible of all their enemies, my gun ready, but with my mind far more murderously inclined towards any of my fellow men who could at such a time have shot them, than toward the wonderful creatures themselves.

The most conspicuous and jolliest of the lesser tenants of this Kaleege jungle were golden-winged laughing thrushes, sturdy birds, clad in grey-striped browns, set off with patches of black, white and greenish gold. They were usually quiet vocally, but for ever making a great racket among the leaves and debris of the jungle floor. They worked in pairs, and from the sound of their progress might have been a whole flock or herd of creatures. Now and then they would leap to a low twig and burst into a rollicking duet —a sudden, startling mutual guffaw of loud, harsh notes. It seemed as out of place amid the quiet of these dim aisles as the antics of a clown in a cathedral.

The setting sun found many loop-holes in the canopy of moss, and the glade became brighter than at midday, the long golden shafts reaching far in through the jungle, turning the moss to golden lacery and the ferns to yellow-green filigree. New bird voices came to my ears—two sad half-tones reiterated until they seemed to embody all the sorrow of the tragedies of the wilderness. The first call of the coming night silenced the voicing of the day's sadness; the deep, gruff *hoo! hoo!* of an owl presaging the still more terrible intimacy of life and death when the sunshine had gone.

Some time later the whirr of wings drew my attention down vista, and there a pair of Black-backed Kaleege balanced on a low, swaying branch. For a brief space they conversed in undertones, each murmuring in the manner so characteristic of all this group of pheasants. The brown hen almost immediately scaled down to a mossy log, took as before a single comprehensive look about, and dropped down in the selfsame place among the ferns, going on to her eggs.

The cock bird ascended the maple sapling, branch after branch, and then crossed to an oak and continued to climb his arboreal ladder until he had almost reached the level of my eye. Walking out on a good-sized branch on the opposite side of the trunk he stood for some minutes, looking down, behind, upward, in every direction, murmuring all the while; his vespers an invocation against the dangers of the night. He then plucked idly at a strand of swaying moss near him, re-arranged a wing feather and settled down for the night, with a last, low chuckle—one among a hundred shapeless bunches of moss. I dimly sighted his scarlet face along the sights of my gun barrel, but would pull trigger neither for science nor dinner. When the light had grown so dim that he merged with the moss fantasies about him, I crept backward, slipped down the moss-deadened surface of the great rock, painfully stretched my stiffened limbs, and made my way silently toward camp.

A week before I was watching blood partridges feeding amid the snow, with no hint of spring in the air; a few days later the mating call of the Satyra Tragopan had come to me amid a glory of rhododendron blossoms; here a jungle home had already been established, and as I walked toward the glow of the camp-fire, and glanced backward at the dark, tangled mass of jungle, I knew that I shared a secret with two of its lesser folk, one sitting close upon her treasures, deep hidden beneath ferns and foliage; the other overhead, helpless to ward off any serious danger, but drawn by love of mate to perch close by, where he might at least watch and perhaps warn of impending harm.

Thus passed an unforgettable day in the haunts of the Black-backed Kaleege.

GENERAL DISTRIBUTION

The Black-backed Kaleege has probably the smallest range of any of its group. It was formerly not uncommon in all suitable localities in Native and British Sikhim, and in western Bhutan. Exactly how far it extends into the latter country is uncertain, but at all events it does not pass the Monas River. In the south it is found, at least in the winter, fairly in the Terai, and from here northward to mid-Native Sikhim, and up to six and eight thousand feet elevation.

I was unable to find any trace of this species in extreme eastern Nepal, although formerly it has been killed on the slopes of Mount Tonglo, on the Singhaleela Range dividing Nepal from Sikhim.

GENERAL ACCOUNT

The shadows of dense forest growth are the favourite haunts of the Black-backed Kaleege, and the increased melanism of its plumage, in both male and female, well reflects its preference for humid, mossy jungles. In ravines, on broad, steep slopes, or on flat valley terraces it may be found, provided always there is dense cover. The foliage of tea bushes is said to suit the bird, so that this sort of change from the primeval forest does not seem to exterminate or drive it away at once, as is the case with almost all other pheasants.

It thrives as near sea-level as the base of the hills will permit, and is found breeding in cool oak forests at seven or even eight thousand feet elevation. There is but slight altitudinal migration, the birds at the higher elevations being forced downward by winter storms, but those living lower down appearing to be resident throughout the year.

The birds seldom leave the cover of their favourite forest undergrowth, except occasionally in the morning and evening, when they come into the open or upon a road to feed. One author speaks of this kaleege as at no time shy, but morning and evening feeding as fearlessly as domestic fowls, allowing one to approach within a few steps. This must have been in some arcady where firearms were unknown, for all the kaleege which I observed were tame only as long as they were absolutely ignorant of one's presence. After that they vanished with all the speed which feet and wings could provide.

When undisturbed, these pheasants are never found perching in the day-time, but feeding or resting on the ground. If approached, but not too suddenly alarmed, their mode of escape is invariably on foot, running swiftly through the underbrush, making hardly a sound, and crouching so low that it is only by the merest trembling of low plants and ferns that their course may be traced. When suddenly flushed on a hillside they take to wing and scale downwards, or on the level along the hillside forest, skilfully dodging the tree-trunks, and alighting fifty yards or more away. By circling the spot of alighting they may often be again flushed. When flushed under similar conditions by a dog or wild animal, they will usually fly up into a neighbouring tree and survey the source of danger before leaving the vicinity.

They are usually rather silent birds, although fond of murmuring to each other and to themselves. Besides this indistinct murmur, which is given with closed beak, the birds have what seems a contented cluck, a muffled tone, also through the nostrils, sounding as if coming from deep within the breast, and uttered when they are quietly feeding or scratching and wholly unsuspicious. This cluck is somewhat more metallic and sharper than the similar note of a domestic fowl. When suspicion comes and a warning is intended, a series of these clucks is run rapidly together, ending with a loud, shrill screech or chirp, uttered with the beak wide open. This implies a strong suspicion of danger, as I have many times observed, and either dies away, if there is no further indication of impending trouble, or gives place to the silent cursorial escape, or the frantic cackling of unrestrained terror accompanying winged flight. When alarmed and suddenly flushed they utter a variety of notes, a loud, sharp outburst of cries, a harsh cackle; *kookri! kookri! kookri!* being perhaps the one most commonly heard and the one easiest of phonetic transcribing.

In common with all his allies, the cock drums with his wings, more especially as a challenge during the breeding season, but also during other seasons of the year. By the natives this sound is thought to be a certain sign of rain. Its frequency just before the season of the rains may be due to the synchronous occurrence of the season of courtship, and in many instances at least, when the cock drums before a rainstorm, it is in direct response to the thunder. Many times after a roll of thunder I have heard drum after drum from first one kaleege, then another. Indeed, all pheasants seem to react nervously at such a time of electric tension, and the species which lack the alar manifestation of excitement crow or cackle their loudest as the reverberations of thunder die away. It is almost unnecessary again to refute the many statements which have been made in regard to the method of drumming of this and other kaleege pheasants. The bird *never* strikes its sides, as does the domestic cock, but drums by quivering its wings through a narrow arc, between its sides and the level of its back, the sound resulting from the air rushing between the large flight feathers.

There are few edible morsels which come amiss to the Black-backed Kaleege. Its food is varied in the extreme, and includes fruit, seeds and insects of all kinds. It will pursue flying grasshoppers, moths, and I have even seen them leap into the air after the

SIKHIM—IN THE HAUNTS OF THE BLACK-BACKED KALEEGE

On the sheltered open slopes, tree ferns filter the sunshine through emerald filigree. In the neighbouring forests we find damp moss hanging from bark, twig and leaves, and the hoofs of deer and the feet of pheasants sink deeply into the soft mould. These kaleege are confined to a tiny bit of the earth's surface in Sikhim and Western Bhutan, but dangers are numerous and they are on guard every moment of the day, watching for snakes, civets, or even little mild-mannered mountain bears, who know how delicious a meal these birds furnish.

SIKHIM:— IN THE HAUNTS OF THE BLACK-BACKED KALEEGE

little drab forest butterflies. Especially do they love the grubs and larvæ of dung insects and those which live in rotten wood, and they even swallow the small millipede pill-bugs, armour and all. They will sometimes repair day after day to the same stump or fallen tree, and labour with beak and claw to penetrate into the tunnels of the hidden insects. Yams are also a favourite article of diet, and the pheasants will often dig quite deep holes and trenches in the mould of open forest glades in search of these fleshy tubers. When they go into the small, field-like places along the edge of the forest, the kaleege find an abundance of seeds of weeds, grain, and other plants, and, in addition, they eat the young tops of ferns and nettles, many kinds of berries, and the fruit of a *Polygonum* and a raspberry which abound in Sikhim. A female which was brought to me by a native shikaree had eaten many small bits of green moss, some very small fern-sprouts and a small turreted snail, while the stomach contained many of the reddish hairs characteristic of begonia leaves. A male bird shot in the late evening had been feeding exclusively on insects, all but one of which were moths. Among these was one large one (*Arcte caerulea* Guerrée), the remainder being smaller and of as yet undescribed species. With these was an enormous orange-headed wasp (*Vespa magnifica* Smith).

The kaleege roosts in trees, and when once found it is easily re-located by the abundant sign on the ground beneath. It is seldom that a bird roosts alone, two usually being found sitting close together, while after the breeding season the young roost with their parents for many weeks. Night after night the birds return to the identical spot, until, as certain sportsmen relate with evident pride, the roosting-place is discovered, when "as many as six may be shot from the tree" by the intrepid Nimrod!

Whether this kaleege ever associates with the small deer of the jungle I do not know. I saw nothing of the kind. It seems well provided with enemies. A few days after I had watched the nesting pair of birds in their haunts I passed close to the log where the hen should have been sitting. A glint of white drew my attention, and parting the ferns I found the seven eggs clawed out, and fragments of shell and yolk all about, covered now with a host of hungry ants. The havoc had been wrought the night before, and a little careful search showed that the self-same baloo was the villain—either the same bear which had passed me two days before or another of the same size. The footprints and signs were unmistakable. In his case, at least, there was no malice aforethought; he had doubtless been searching for grubs and tubers and berries, and had ambled aimlessly up to the fallen tree. But the sudden apparition of his great paw, which he had rested on the soft moss, had sent the mother pheasant in swift, terrified flight. The sudden roar of wings must have brought memories of other ovivorous days, and we can imagine how eagerly he sniffed the eggs and clawed them out into a broken pile, licking the shells and his dripping paws with satisfaction. Thus had seven little pheasant lives come to nought. Two more days passed and then, for several mornings, I heard an intermittent drumming from this same patch of forest. It was undoubtedly the first hint of the founding of a new home.

On the last day which I spent in this glade of the kaleege I had another most vivid example of the dangers to which these wild creatures are subject. I reached my favourite boulder at noon and lay for several hours watching the life of the jungle. At first it was unusually warm and quite breathless—the forest fairly steamed in the unwonted heat. Then a cool breeze sprang up, followed by a sudden bank of dark clouds well above the valley. From these a terrific burst of hail descended without warning. The foliage and moss were torn to shreds as by shot. The pain of the impact was so great that I crouched close between an out-jutting bit of rock and a sloping tree-trunk. Holding my hand out for a moment, it stung and pained as if lashed by a whip. In a very short time the pellets of ice were piled up three to five inches, and untold numbers of forest creatures must have perished miserably. The ferns about the old nest of the kaleege were lashed flat. Two nests, the one of a warbler and the other a flycatcher's, which I had been watching, were literally beaten from their supports and their contents crushed. Every blossom was in shreds, not a leaf remained whole, and the forest, from the peace and warmth and life of the full flush of spring, took on the death-like aspect of winter.

While the storm lasted the cold was intense and the downpour was intermittent; first hail in sheets for several minutes, then blue sky and a momentary gleam of the sun through a rent in the swirling grey clouds; next a fierce downpour of rain, changing almost at once to the cruel ice. Such storms kill dogs, fowls, geese, cattle and even men, and the destruction of pheasants and their eggs and young must be enormous. Immediately after this terrific storm, a pair of dainty verditer flycatchers and a tiny white butterfly flew across the glade, showing that somewhere there were havens of safety where even the most delicate craft might weather out the gale. Owls and small martens are probably the worst enemies of the kaleege among the living inhabitants of the forests.

The natives say that the males are very pugnacious and fight fiercely during the season of courtship. Certain it is that the birds remain together throughout the year, apparently paired for life, and that the male stays in the immediate vicinity of the nest during incubation, and later takes his full share in finding food for, and defending the chicks.

The nesting season varies with the altitude. Lower down, in the foot-hills, the eggs may be deposited as early as March, while mid-April is the usual season for the majority of the kaleege. Again, near the upper limits of the pheasants' range, eggs have been found as late as the end of July.

No nest worthy of the name is ever built. On the tea plantations the eggs are laid in clumps of grass at the foot of the tea-bushes, while in the forest itself a hollow is scratched, or the dead leaves and moss merely pressed down by the weight of the bird's body, often under the shelter of a projecting rock, or, as in the case of the nest of which I have already written, hidden by ferns and close to a great fallen tree.

I have known of five eggs which had been incubated for at least ten days, and which thus would seem to compose a full set, while ten appears to be the largest set recorded. Six to eight are by far the more usual numbers. Unusually fortunate covies including eight young have been observed, but two, three, or at the most four, are the more usual number of survivors of the nesting perils.

The eggs vary considerably in shape, some being broader, more round, while other slender ones are more perfect ovals. In tint, too, there is very wide variation, from pale pinkish creamy, and very pale *café au lait* to a very rich dark coffee colour. The tint appears to be quite constant in the eggs of the same individual, one pheasant having a whole nestful of pale eggs, while another will lay eggs invariably of a warm, darkish brown. The eggs vary from 45 to 50 mm. in length, and from 36 to 39 mm. in breadth, the average being about 48 by 37 mm.

Formerly the Black-backed Kaleege were abundant, but constant snaring and shooting in and out of season has sadly depleted their numbers. As early as 1885 it was said of the kaleege about Darjeeling that while they used to be very common, now few are seen, and in 1900 the same author (W. P. Masson) adds that, owing to the forest chowkidars snaring the birds all the year round, the kaleege is now one of the rarest birds near the hill station. This is true of all the more frequented parts of the bird's range, although it is still fairly common in many isolated forests. Its haunts are all so accessible, however, and the range as a whole is so limited in extent, that the close season must be enforced rigorously if the species is not to become extinct. The fact that it thrives on the tea estates is a point in its favour, for the owners can forbid all killing or snaring on their grounds with much more hope of enforcement than could possibly be the case with the successful carrying out of any general law.

On the other hand, it is almost impossible to keep the coolies from appropriating every egg which they find, and so, in spite of protection of the old birds, they are constantly growing scarcer, and as the majority of these kaleege live in places which will sooner or later be turned into the lucrative tea estates, there seems little ultimate hope for the species.

CAPTIVITY

A number of Black-backed Kaleege were among the survivors of the large pheasant collection which was received in London in July 1857, and they bred in the gardens of the Zoological Society the following year. Since then this species has been reared in captivity many times in most of the large public collections and by many private individuals. Two rather remarkable crosses have been produced of this species with the Impeyan and with Reeves pheasant.

Its care in captivity differs in no way from that which should be accorded to the common silver pheasant, of which I have treated in detail as typical of this entire genus. The period of incubation of the Black-backed Kaleege is about twenty-four days. Of eight individuals confined in the London Zoo of which a record has been kept, the average length of life was three years and nine months, while the longest-lived kaleege survived for a period of thirteen years and five months, this being the record for longevity for the whole genus.

DETAILED DESCRIPTION

ADULT MALE.—Crest shorter than in the white-crested kaleege, but of the same filamentous, hairy character. Crown, crest and neck all around glossy steel blue. Mantle and back bluish purple, rump with more greenish reflections, all the feathers with a convex fringe of deep, rich purple. Wing-coverts and secondaries glossed with greenish. Primaries dull brown, secondaries dull brownish-black on the concealed parts of the webs. Upper tail-coverts and tail-feathers metallic purplish-green on the exposed portions of the webs, dull black elsewhere. Ear-coverts, chin and throat dull black, the latter merging almost at once into the lanceolate, almost pure white, under plumage. This is whiter than in either *albocristatus* or *leucomelanus* as far back as the mid-abdomen, where the feathers lose their tapering character. The flanks and posterior portion of the abdomen are brownish-black. All the feathers of the lower plumage have white shafts, conspicuous only on the darker feathers. The under tail-coverts are slightly glossed with greenish.

The facial skin is scarlet, with almost no trace of featherlets except on the fleshy grey lower eye-lid. In fully adult males the gular wattles are quite well developed. The mandibles are yellowish, or more usually greenish horn colour, darker at the base and about the nostrils. The irides are a warm hazel brown. Legs and feet pale horny brown. Weight, 2 lbs. 6 ozs. to 2 lbs. 12 ozs. Length, 530 to 630; expanse, 670 to 730; wing, 235; tail, 265; tarsus, 75; middle toe and claw, 65; bill from nostril, 19 mm.

In an extreme type of coloration, which, however, is rare, there is no trace of white on the upper plumage, the purple fringe being immaculate. In the greater proportion of individuals many of the feathers of the back, rump, inner wing-coverts and tertiaries have a conspicuous mottled white terminal fringe. Blyth's type now in the Indian Museum, Calcutta, is a good example of this. A few of the scapulars show faint traces of terminal white, increasing on the lesser coverts to a very distinct band, and reaching its maximum on the middle coverts, where, besides the terminal band, there is a white mottling for two or three millimetres farther up on the webs. On most of these coverts the white is so pronounced that it is plainly visible twenty feet away. On the rump feathers the white is present as a faint, light band, most strongly developed on the most posterior rump feathers. Now and then a bird will be found with the mantle tipped with shaded grey as in *albocristatus*. This appearance of grey or silvery white on the mantle feathers is always correlated with a change in form as well, the feathers being pointed and narrowed in exact proportion to the amount of light colour; and truncated and broadened as there is less, or a total lack of the whitish. These are undoubted indications of close relationship with the allied kaleege, but I know of no specimen indicating true sub-specific connection or hybridism, and do not believe that the several species now intergrade or cross in a wild state.

Rather curiously, the traces of the atavistic light vermiculation on the middle tail-feathers are found on fewer individuals and, on the whole, less strongly developed than in *albocristatus* and *leucomelanus*, in which it is so common a character in both young and adult male birds.

Adult Female.—Fresh skins of this species show a very decided difference from the females of the Nepal kaleege, in the very pronounced melanism of the entire plumage. Whereas the latter would be described as rufescent, *melanonotus* is distinctly black. There is, as in all of these kaleege, considerable variation, but the lightest and brownest of a large series which I collected in various parts of Sikhim, are distinguishable at a glance from the fresh Nepal specimens.

The crown and crest are dark brown, while the chin, throat, lower face and neck all around are grey, paler below, but cold grey on the side and hind neck. The entire upper plumage in dark specimens is a blackish brown, with well-marked grey terminal margins, these becoming wide white bands on the wing-coverts, forming very conspicuous bars. In browner individuals the dorsal plumage is indistinctly mottled with dark reddish-brown and black, the warmer tone becoming strongest on the rump. Here too the terminal band loses its pure grey character and becomes increasingly buffy posteriorly.

In the vermiculation of the middle tail-feathers *melanonotus* has the red darker, more rufous and less buffy than in *leucomelanus*, and, in the great majority of individuals, with a decided preponderance of greenish glossed black on the outer webs, in some specimens the rufous markings being almost obliterated. Then again in *melanonotus* the lateral tail-feathers are almost wholly unmarked greenish, lacking the paler vermiculation which in *leucomelanus* often extends over the margins of several pairs.

The lower plumage of a typical fresh *melanonotus* female shows a strongly contrasted black and white coloration, the latter colour forming a very wide terminal band and grading into the black through a narrow buffy zone. In very brown individuals this buffy zone gives place to a more or less extensive area of rich dark rufous, merging abruptly into the black of the remainder of the feather.

The facial skin is dark red, dotted with numerous featherlets, and the eye is dark hazel. The general degree of melanism is reflected very exactly in the pigmentation of the mandibles. In the lightest, reddest individuals the basal black covers only about half of the upper mandible, and is broken by two large lateral patches on the culmen, where the greenish horn predominates. In the dark birds, on the other hand, the upper mandible is almost or quite black, only the extreme tip showing the paler hue. The legs and feet are darker than in *leucomelanus*. Weight, 1 lb. 14 ozs. to 2 lbs. 4 ozs. Length, 450 to 530; expanse, 630 to 680; wing, 220; tail, 200; tarsus, 70; middle toe and claw, 57 mm.

Variation.—I wish here to speak of a most interesting and unexpected change in colour which I have observed in museum skins of female kaleege, an alteration which is especially noticeable in this very dark-plumaged bird. The extreme is to be observed in Blyth's type which is in the Indian Museum, Calcutta. In the catalogue of the birds of the Asiatic Society this specimen is annotated, "Mr. Webb, 1845," so that we may assume that it is about seventy-five years of age. The difference between this and the very brownest bird which I could secure in Sikhim is startling. Although, as far as I could learn, it has never been exposed to the light, yet it is paler than the palest of any fresh kaleege of any species, while when compared with a typical black *melanonotus* female, the two would never be suspected of close relationship. This is an extreme case, but I have carefully compared my fresh skins of the three Himalayan kaleege females with those in the museums of London, Berlin, Paris and elsewhere, and invariably I have found a greater or lesser degree of paling—an apparent breaking down of the black pigment into a more primitive reddish brown. Even when this is slight it is sufficient to obscure the distinctness of the various species, which in comparatively fresh wild birds is quite obvious.

The same is true in a lesser degree of the males, and I have a number of museum specimens which show the browning of all the black, especially of the primaries and the edges of the contour feathers, and which is due to some factor other than direct light, although this will bring about the same result more quickly.

Chick in Down.—Chicks three or four days old collected in Sikhim May 20, have the crown, neck and mantle down warm rufous. A black line extends obliquely downward and backward from the posterior edge of the eye to the neck, widening somewhat on the ear-coverts and dying out on the hind neck. The remainder of the upper parts is dark chocolate brown, almost black, with two wide, lateral, pale buff stripes from the scapulars to the tail down. The face is pale buffy white, and the under parts creamy white, tinged with pale rufous on the sides.

The bill is pale greenish or yellowish horn, darker at the base and along the culmen. Irides dark olive-hazel. Legs and feet reddish flesh colour.

Bill from nostril, 6 mm.; length, 90; wing, 45; tarsus, 22; middle toe and claw, 20.

Juvenile Plumage of Male.—The sexes are distinguishable in this plumage, the male being blacker, while the female has more brown or reddish in the feathers. The male has the upper part of the head, neck and fore-mantle uniform dark smoky brown, almost unmarked. From the mantle posteriorly over the anterior back and wings, appears the regular juvenile pattern of a sub-terminal black bar. This is bordered by faint grey on the mantle and back, and is thus rather inconspicuous, but on the wing-coverts a whitish terminal shaft-spot is developed, and the black is bordered proximally and distally by wide reddish-brown bands, which set it off in sharp contrast. On the greater coverts the terminal white increases. The lower back and rump are rather indistinctly patterned, a dull buffy mottling near the tip of the feathers. The flight feathers are dark brown, strongly vermiculated with reddish brown on the exposed webs.

The rectrices are narrow and pointed; black or slighted glossed with greenish; the central pair, and the next pairs marginally, coarsely vermiculated with buff and greyish.

The chin and throat are pure white, shading very gradually into the lower plumage. As we leave the white area a blackish mottling obscures more and more of the feather, until only a central noded streak remains. This is the pattern of the side and lower neck. The remainder of the ventral plumage is a confused but coarse mottling of dark brown and buffy white, the margins of the feathers being pure white. On the abdomen the disintegrated plumage is wholly white, the flanks being dark brown. The facial skin is fairly free from the down and is fleshy pink; the legs and feet fleshy horn colour.

Bill from nostril, 14 mm.; length, 390; wing, 165; tail, 150; tarsus, 60; middle toe and claw, 50.

Juvenile Female.—The rufous down of the head is replaced by a buffy brown, faintly barred with black. The hind neck is rather grey, with broad black tips, and on the mantle, reddish brown bands appear, which frame and emphasize the black, here sub-terminal, band. On many of the feathers this band is constricted at the

PLUMAGES OF THE BLACK-BACKED KALEEGE

Gennaeus melanonotus (Blyth)

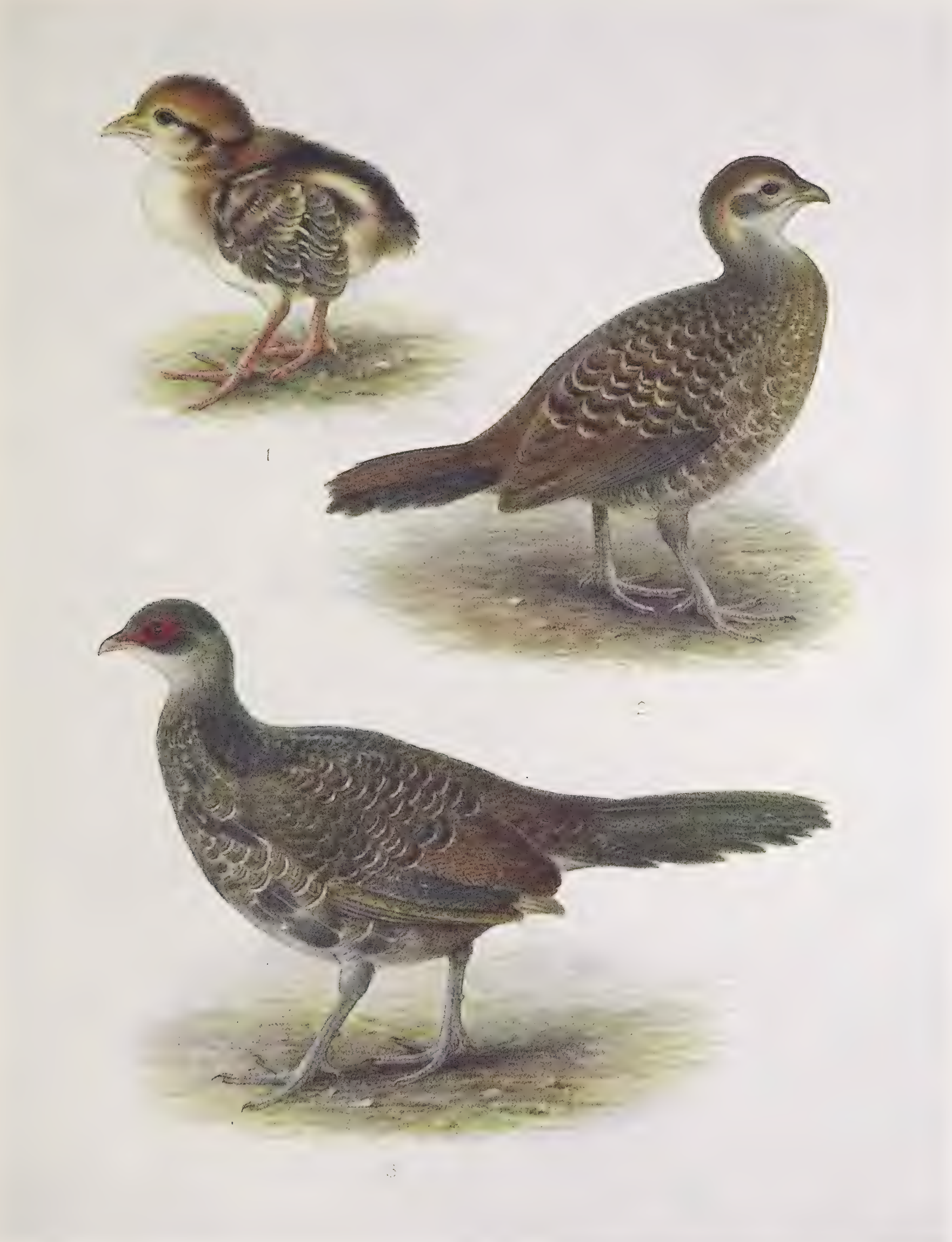
Even when young Black-backed Kaleege have moulted late, the shape, pattern and colour of the adult plumage are not fully attained until after the first year.

Fig. 1. Chick in down four days old, collected in Sikhim, May 20th.

Fig. 2. The sexes are clearly distinguishable in the juvenile plumage, the female showing much warmer, more buffy tones, especially on the head, back and tail. In this individual, the down is still present on the face, concealing the reddish skin beneath.

Fig. 3. The juvenile male is darker throughout, with narrower white tips to the feathers. The incoming dark, central tail-feathers are not clear black, but coarsely vermiculated with grey.

PLATE XXIV.



PLUMAGES OF THE BLACK-BACKED KALEEGE.

shaft, and with the framing of reddish, presents a decidedly occellated appearance. On all the wing-coverts the black becomes very broad, distinct and unbroken, and the feather is terminated by an almost equally wide and very conspicuous band of pale creamy buff.

The secondaries are uniformly vermiculated with reddish brown and black on the exposed parts of the webs, while the primaries have only a very narrow edging of the buff markings. The lower back and rump are almost unmarked. The central pair of tail-feathers are mottled and vermiculated equally with black and a richer chestnut than is found elsewhere on the plumage. The lateral rectrices are irregularly and sparingly mottled with reddish brown.

In a female a week younger than the juvenile male described, the pale facial down is still present, so the reddish colour of the facial skin of the female at this age is not so apparent as in the other individual. The chin and throat are pure white, the ear-coverts and throat band grey. The lower plumage of buffy brown, indistinctly and faintly mottled with darker, begins abruptly at the grey of the neck, paling to a buffy white on the belly and abdomen, and becoming an indefinite dark brown on the sides and flanks. Fleshy tints as in male.

Bill from nostril, 11 mm.; length, 300; wing, 150; tail, 110; tarsus, 40; middle toe and claw, 35.

Blyth's type of a quarter-grown female, in the Indian Museum, shows almost as extreme fading as does the adult female type, being of a pale reddish brown, paler even than any fresh individual *albocristatus* which I have seen.

First Year Plumage.—In the male of *melanonotus*, as in the other kaleege, the bird may or may not bear traces of its immaturity throughout its first year of life, in the form of greyish vermiculations on the coverts, secondaries and central tail-feathers. In the juvenile plumage there is no hint of the ultimate lanceolate form of the breast feathers, and the incoming plumage, if acquired early, is predominately dark, and not nearly so narrow and tapering as the succeeding plumage of the second annual moult will be.

EARLY HISTORY

In the "General History of Birds," Dr. John Latham in 1823 described a bird, calling it the Chittygong pheasant. His summary of knowledge of the bird occupied two lines: "Inhabits India; is a native of the Chittygong Hills, and known by the name of Muthurau." Gray in 1829 calls the bird *Phasianus muthura*, while in his "Genera of Birds" Gray gives the genus as *Gallophasis*. It is doubtful whether this species is indicated, especially as it was said to be "the size of a turkey." So the name *melanotus*, given by Blyth in 1848 to what was undoubtedly this form, is usually accepted as the earliest authentic name. It was 1857 before the first living specimens were received at the London Zoo.

SYNONYMY

? *Chittygong Pheasant* Latham, Gen. Hist. VIII. 1823, p. 200.
? *Phasianus muthura* Gray, in Griff. ed. Cuv. III. 1829, p. 27.
? *Gallophasis muthura* Gray, Gen. B. III. 1845, p. 498.

Euplocomus melanotus (Blyth), Hutton, J. As. Soc. Beng. XVII. Pt. 2, 1848, p. 694; Blyth, Cat. Mus. As. Soc. 1849, p. 244.

Gallophasis melanotus Hodgson, Icon. ined. in Brit. Mus. Gall. App. pl. No. 937; Gray, Gen. B. III. App. 1849, p. 24; Mitchell, Proc. Zool. Soc. 1858, p. 545, pl. 149, Fig. 2; Sclater, Proc. Zool. Soc. 1859, p. 205; Gray, Cat. Hodgs. ed. 2, 1863, p. 68; Jerdon, B. Ind. III. 1863, p. 534; Brehm, Der Zoologische Garten, 1864, p. 197; Hume, N. and E. Ind. B. 1873, p. 527; Marshall, B. Nest Ind. 1877, p. 59; Masson, Game-birds of Darjeeling, 1885, p. 16.

Euplocamus melanotus Sclater, List of Phas. 1863, p. 9 [Sikhim and Bhotan]; Gray, List Gallinae Brit. Mus. 1867, p. 33; id. Hand-list B. II. 1870, p. 260; Elliott, Mon. Phas. II. 1872, pl. 119; Hume and Inglis, Stray Feathers, V. 1877, p. 42; Sclater, Ibis, 1892, p. 86; Tegetmeier, Pheasants, 1904, p. 227; Mitchell, Proc. Zool. Soc. London, 1911, p. 522.

Gallophasis melanonotus Beavan, Ibis, 1868, p. 381 (Darjeeling, Interior of Sikhim, 2,000–7,000 feet); Bulger, Ibis, 1869, p. 170 (Darjeeling).

Euplocomus melanonotus Hume and Marshall, Game-birds India, I. 1878, p. 191, pl.

Euplocamus melanonotus Sclater, List Animals in Garden, London Zool. Soc. 1883, p. 486; Evans, Ibis, 1891, p. 77.

Gennaeus muthura Grant, Cat. Game-birds, XXII. 1893, p. 301; Nehrkorn, Katalog der Eiersammlung, 1899, p. 193; Rothschild, Bull. Brit. Or. Club. XIV. 1904, p. 58; Ghigi, Mem. Acad. Bologna (6), V. 1908, p. 145.

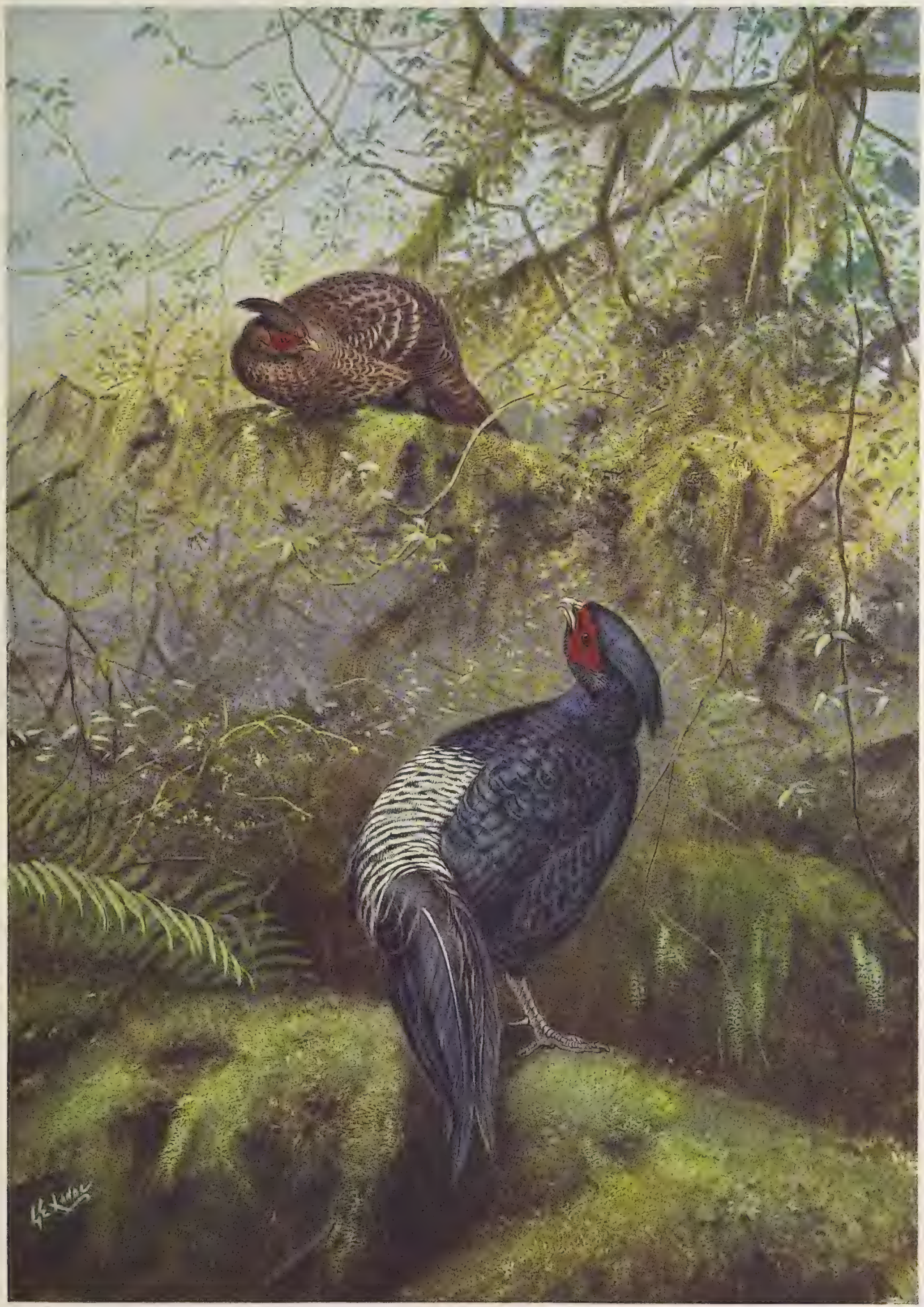
Gennaeus melanonotus Grant, Hand-book Game-birds, I. 1895, p. 263; Blanford, Fauna Brit. India, Birds, IV, 1898, p. 91; Oates, Game-birds India, I. 1898, p. 331; Sharpe, Hand-list Birds, I. 1899, p. 35; Oates, Cat. Eggs Brit. Mus. I. 1901, p. 54; Beebe, Records Ind. Mus. V. 1910, p. 268; Beebe, Zoologica, I., No. 17, 1914, p. 320; Baker, Jour. Bombay Nat. Hist. Soc. XXIII. 1915, p. 668; Baker, Jour. Bombay Nat. Hist. Soc. XXV. 1917, p. 175.

BLACK-BREASTED KALEEGE

Gennaeus horsfieldi (Gray)

Among the moss-hung forests and the bamboo thickets of north-eastern Burma, I first heard the bubbling murmur and cackle of this pheasant. In pairs or in small flocks they work slowly through the ferns and over fallen logs, their scarlet facial skin glowing like the ginger blossoms beneath their feet. A grouse-like whirr of their wings, or the sound of scratching among dry leaves would often indicate their presence, but they were always on the alert, watching and listening for danger with keen eyes and ears.

PLATE XXV.



BLACK-BREASTED KALEEGE.

BLACK-BREASTED KALEEGE

Gennaeus horsfieldi (Gray)

NAMES.—Specific: *horsfieldi*, named for Dr. Thomas Horsfield, an English naturalist, who carried on scientific work in the East. English: Black-breasted, Purple or Horsfield's Kaleege. French: Faisan huppifère de Horsfield; Houppifère pourpré. German: Stahlblaues Fasanhuhn. Native: Dooreek (Dibrugarh); Durug, Dirrik (Garo Hills); Motoora (Khasi, Sylhet); Muthura (Chittagong).

BRIEF DESCRIPTION.—Male: Entire plumage black, glossed with purplish or steel-blue; the feathers of the lower back, rump and upper tail-coverts margined with white; the lower plumage only slightly pointed. Female: Olive-brown; tip of crest rufous; chin and throat whitish; wings and ventral plumage tipped with paler brown; central tail-feathers deep ferruginous; in general more rufescent than the other Himalayan Kaleege.

RANGE.—Eastern Bhutan, Assam and Upper Burma.

THE BIRD IN ITS HAUNTS

MY first experience with this bird in Burma, east of the Irrawaddy, was most interesting. We were encamped near the small Shan village of Wau-hsaung, at the foot of the mountains, which rose range beyond range eastward until they culminated at the Chinese frontier, forty miles away.

The banks of the Namli River were covered with dense undergrowth, through which the great spreading horns of many water buffaloes had worn a maze of trails. The clumps of bamboo had been browzed back until they had taken the form of huge umbrellas. The rains had not yet ceased, and butterflies in scores of species and individuals filled the forest and the narrow lanes.

In a slight mist I walked a hundred yards into the undergrowth, bending low to accommodate myself to the buffalo tunnel trails. Not far from the stream I found a flock of small birds, several species of babblers, silver-eared mesias, yellow-backed sunbirds and a single scarlet minivet, flashing like a flame against the dark leaves. I shot a gorgeous sultan-bird, and was wrapping it up when there came to my ears, like an electric shock, the inimitable bubbling murmur and cackle of a kaleege pheasant. I sank down upon the mud, and found that the sound came from the steep, thicket-covered bank leading down to a slimy backwater of the stream.

The note of these birds is one of the few in nature which sounds distant when uttered close by, and besides raising and cocking my gun I dared not move. I greatly desired a specimen, to see if the birds from this comparatively low elevation possessed any of the remarkable variability of those higher and farther east.

Five minutes passed, and no further sound came from the birds. A family of babblers passed, fortunately without discovering me; a big green barbet began his rolling, croaking song overhead, and a pair of pygmy falcons, swallow-like in size and colour, perched on a slanting bamboo and caught butterflies and grasshoppers. A flurry of rain and a gust of wind sent down leaves and twigs, and filled the air about me with the sweet odour of the large pink blossoms which draped the trees overhead.

I fixed my eye on a rotten log, and strived at the same time to take note of the line of underbrush each side. I longed to stretch my 20° of vision to the 85° of a hare!

Without a note or sound of approach I suddenly saw a crested head shoot up from behind the log, just along the barrel of the gun, and not six feet from the end. The patch of scarlet face skin shone for an instant as brilliantly as the flaming ginger blossom at my feet. I pulled trigger and a cloud of leaves, splinters and earth flew up and two male pheasants rose, flew ten or fifteen feet and settled again. I lay quietly, and, to my surprise, the birds came nearer, cackling and gurgling excitedly. Now they shifted to the right, then to the left, always out of sight down the hill.

I knew the slightest movement of mine would alarm them, so I flattened down into the spicy forest ooze and waited. They would advance a few yards, cackle, then give their wing whirr softly and return. Twice when a little distance away they had encounters—feinting like game-cocks and striking with their spurs. But no real harm was intended, and the mock battles seemed but the result of their excitement. Finally, they made a complete circle to higher ground, discovered me and ran rapidly off.

For at least five minutes the two birds had remained within twenty-five feet of where the shot had been fired. Creeping to the log, I peered over and saw my bird lying dead a few feet down the slope, killed not by my shot, but by the shower of debris. It was a Black-breasted Kaleege, typical in every feather.

GENERAL DISTRIBUTION

The range of the Black-breasted Kaleege covers Eastern Bhutan, Assam and much of Upper Burma, including Sylhet, Cachar, Hill Tipperah, Chittagong, North Arrakan and Manipur. To the north it ranges throughout the terai and foot-hills of Bhutan from 91° E. Long. east to at least beyond Sadiya. To the west it does not reach the Brahmapootra, although this is probably due only to lack of favourable country. It touches the coast in Chittagong and Northern Arrakan, extending southward to 20° or perhaps 19° N. Lat. It thence ranges diagonally north-eastward until it reaches its most easterly point just east of the Irrawaddy, at about 26° N. Lat. and almost 98° E. Long.

GENERAL ACCOUNT

The Black-breasted Kaleege is one of the most interesting of its group. It is the first of the kaleege which are strung in a line along the Himalayan terai and foot-hills from east to west, *horsfieldi*, *melanonotus*, *leucomelanus* and *albocristatus*. The Black-breasted has a wider range than any of the others, and is notable as being one of the three *Gennaeus* which meet in Burma, hybridize and give rise to the numerous forms to which names have been given indiscriminately.

Curiously enough it is the darkest of the allied Himalayan kaleege, while it touches and crosses with the Silver forms which are the whitest. Its haunts are at lower altitudes than the others, and much more humid in character. Its home range, like that of most of its genus, is restricted, the individuals having regular habits, and following much the same route to water and feeding-grounds every day.

During my brief stay I could detect no signs of seasonal migration, and many observers reported to me that there is none. The birds are so omnivorous that they are not affected by the local ripening of any certain fruit or berry, and seem to pursue the even tenor of their life from season to season, merely retiring at the breeding season, for the purpose of nesting, to deeper, more isolated portions of the jungle.

In Upper Burma I found the Black-breasted Kaleege in bamboo jungle, near the bottoms of rather steep valleys, and along the trails which wound about the slopes, never over a thousand feet elevation. In Cachar this species is said to favour low forests near rivers, while occasionally they venture into rice clearings. In Sylhet they live on hillocks, overgrown with cane, bamboo and tree jungle, isolated by small streams, and here in the thick underbrush the birds spend the day. Wherever reported they seem to delight in coming into roads and trails morning and afternoon to scratch and feed, keeping keenly on the lookout for danger.

Finding that the Black-backed Kaleege were abundant near Wau-hsaung I remained there some time studying them, and found their habits to differ in no way from those more in the centre of distribution, to the westward, in Assam. This region was only a day's march east of the Irrawaddy, across from Myitkyina, the terminal of the railroad in Upper Burma, and about seven hundred and fifty miles north of Rangoon.

I have already recounted meeting the trio of kaleege, one of which I shot. I had had abundant opportunity to observe the two remaining kaleege pheasants, and noted that one was dark, and, like the one I secured, typical *horsfieldi*. The third was decidedly light, showing distinct white vermiculations on the upper parts and along the central tail feathers. When at last I secured it, I found that it corresponded most closely to what has been called *obscurus*. All were young males, just completing their moult into fully adult plumage.

These birds proved to be fairly numerous and not difficult to observe. But one factor made the work exciting—the buffaloes. A half-dozen gigantic, black mothers roamed about the woods, each having in tow a callow, whitish calf. Huge as they were, these creatures made but little noise when walking slowly over the mud, and more than once I had hastily to take to trees. Later in the same day, when I shot my first kaleege, I was crouched close to where a bird was scratching loudly. I had signalled to my companion to circle around ahead of me to force the pheasant into view. Hearing no response I crept back to the lane, and saw him perched some ten feet from the ground, while an irate water buffalo parent tore up sod and snorted angrily below. On the other hand, the presence of so many of these creatures made it an easier matter stalking the pheasants, the birds being accustomed to their movement through the underbrush.

Several tall trees, covered with ripened fruit, stood near the river-bank, and all day were filled with birds, a constant rain of berries and pits falling through the leaves. In a few days I counted forty species of birds feeding on this fruit, and early one morning, when the fog from the mountains was too thick to see through, I heard, as I walked beneath, the unmistakable note of kaleege. Two birds—male and female—

were perched twenty feet up in the tree. They flew as soon as the fog thinned, and I found by the sign that their occupation of the tree had been for roosting purposes.

The kaleege, for the most part, roosted at a moderate height in trees at some distance from the stream. Night after night they would return to the same tree, but if frightened would resort to some other place. In two such instances, the birds, presumably the same pair in each case, again returned to the first roost after an interval of one or two nights.

The kaleege showed little fear of the native Shans, who worked about their homes in the village, or with huge axes and tiny bows went into the forest for wood. I have seen a pheasant quietly scratching within ten feet of a trail along which Shans were passing from time to time, and close to the sound of chopping.

Early morning was the best time to observe the birds. Just when the mists were beginning to clear away, but long before the sun reached the mountain tops, if one walked along the trail, the trees and bushes appeared much as near a New England road. Vines clambered high over the trees, and one saw leaves which simulated wild grape, witch hazel and alder.

A bulbul would open the chorus with a phrase of clear, sweet notes, and a gang of laughing thrushes usually followed with a united guffaw, jay-like. Before the full morning songs of the smaller birds greeted the sun, doves' voices were supreme—coos, high and low, from all directions. Then, softly, as from a distance, came a louder, muffled tone, and the sudden, unexpected break into a cackle which never failed to thrill me. After a space arose a mellow whirr—the sound of wings in rapid motion, and yet how unlike the sound of flight! The ear at once detected the difference—one the wing-beat set to music, the other the more usual hum of utility. The latter marks the acme of evolution through untold generations of awkward flapping reptiles; the former reaches the ideal—an approach to our own ability of adapting earthly evolved structures to psychic enjoyments.

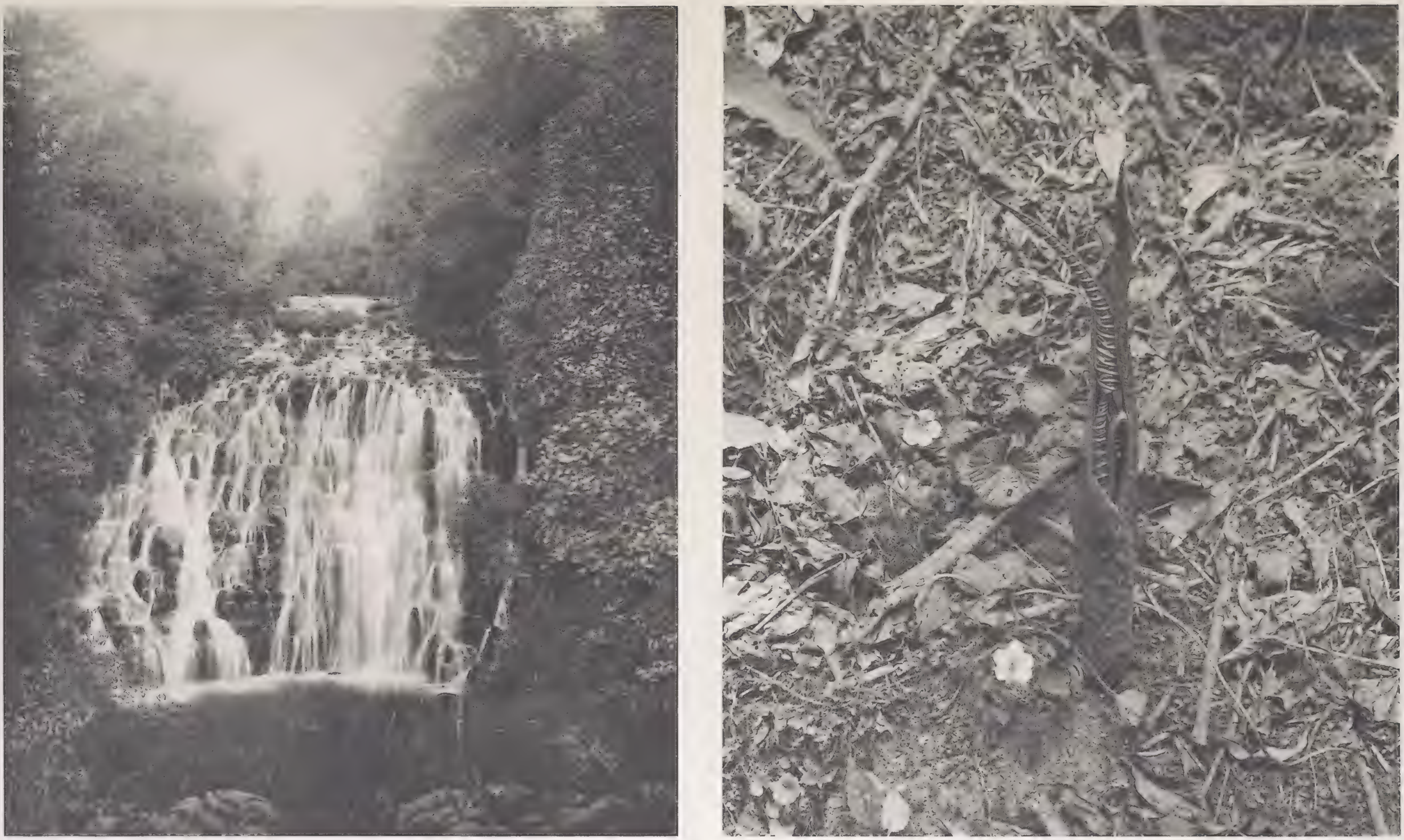
The wing-beat of the kaleege during the period of courtship is beyond doubt a challenge—cocks will respond with foolhardy impetuosity to a poor imitation. But I have known it to be produced by a hen, and have seen the chicks run to her at the sound. I have seen it used, as I have narrated, by the survivors in an attempt to summon a fallen member of the flock. When it is produced in early morning by yearling birds at the end of the rains, I accredit it without hesitation to the same outburst of feeling which prompts the bulbul's song at this non-breeding season—a symbol of sheer exuberant spirits.

At this time of year (November) the kaleege were in pairs—feeding and roosting together—or in parties of three to five young birds, the sexes sometimes distinct, although occasionally, at a distance from Wau-hsaung, I saw them mingling together.

There were one or two tigers in the vicinity of Wau-hsaung, but I suppose the birds had little to fear from these large carnivora. But some species of small cat fed regularly on the chocolate squirrels, with a narrow white ventral band, which were so abundant here. I found their tracks often near the haunts of the pheasants, and once I came across the remains of a kaleege strewn about a favourite drinking-place of the cats. Twice I heard pheasants in what must have been sheer extremity—that cry of despair which, even when it emanates from a domestic fowl, serves to silence every bird within hearing. This cat,

WHERE HORSFIELD'S KALEEGE MAKES ITS HOME

THESE pheasants wander in families or small companies through the dense jungles, coming now and then upon beautiful streams, flowing slowly and quietly around the roots of great trees, or pouring in a headlong cascade over a ledge of rocks. Here the birds slake their thirst and then pass on again into the forest. I once watched a pair of birds scratching and pecking on a hillside among green begonias and jack-in-the-pulpits, making the leaves and twigs fly in all directions. The sound could be heard for many yards, but the vigilance of the birds never relaxed, and at the slightest suspicion of danger they were off like two meteors.



WHERE HORSFIELD'S KALEEGE MAKES ITS HOME.

whatever the species, is doubtless the worst foe of the kaleege. When I saw how it was possible, by crawling flat upon the ooze, to creep close to a bird intent upon demolishing a termite nest, I realized how the dread feline—mottled and small—could creep easily within striking distance. And yet the birds were ever on the alert, the head, with its brilliant facial skin, shooting up and turning in every direction between each hasty peck.

Even more than the other kaleege the Black-breasted is voluble, and seldom an hour passes when it can resist cackling or wing-beating. This habit, and taking into consideration the constant noisy scratching among dead leaves, makes the locating of these birds a rather easy matter. And yet they are not as sociable as others of the genus, and six or eight is a very unusual number to find together. Usually a pair is seen alone, although when following some easy route to water several groups will sometimes drift together and not separate until roosting time.

The food taken varies greatly, not only in different localities, but from week to week on the same slopes. I have shot one of four birds which had spent the day feeding on berries, and which had its crops crammed with these alone, and the following day I secured another member of the flock, disturbing them at a banquet of termites, and finding the bird's crop distended with these long-suffering insects. In connection with this food, R. A. Clark of Cachar says that he once watched an encounter between a Black-breasted Kaleege and a red junglefowl "for the possession of a white-ant hill from which the winged termites were issuing. I watched the contest for a quarter of an hour, by which time both birds were exhausted, when the kaleege fled, leaving the jungle cock in possession. On another occasion I came across a pair of male kaleege fighting amongst a lot of ferns. They were so taken up with their own affairs that they did not notice my having approached to within fifteen yards. I let them go on for ten minutes, and then went up and caught both. They were quite exhausted. The feathers from the head and neck had all been knocked off, and the latter were bleeding in both birds."

Several accounts agree in confirming the pugnacious character of these kaleege, and Inglis says of the species in Cachar that when he once winged a female, "she got into the jungle on the slope of a teelah. It was very steep, and I sent a man to catch the bird. No sooner had he caught her than the cock came rushing at him. He made a thrust at it, but couldn't hit it. The bird then retired, but only to renew the attack a second time. It did this three or four times whilst the man was bringing down its mate. In the end I shot it also."

An interesting case of a cock kaleege caring for his brood of newly-hatched birds is recorded by H. W. A. Watson. He says, "I saw no signs of the hen, though I watched the cock for several minutes. Probably she was absent looking for food. The cock was very aggressive, and ran around demonstrating, often coming within ten yards of me. The chicks were hiding in the leaves, one within a few inches of my feet."

I have seen them scratching about the shallows of small, sluggish jungle streams, and in more than one bird have found the remains of small crayfish, usually only the cephalothorax and the abdomen, the birds apparently discarding the less nourishing limbs and other portions. The crayfish in the gizzard were always accompanied by a quantity of small quartz pebbles. In Burma a large fleshy fruit is often eaten, pecked into small pieces before being swallowed, while small black seeds and black ants are two other favourite items of diet in the order of their abundance. Bamboo shoots, earthworms, small centipedes and moths are also eaten freely.

The breeding season in Upper Burma corresponds to that in other parts of the range—April and May, with delayed broods extending into June. The nest is a hollow in the ground, usually at the foot of a tree, the eggs sometimes laid on the moss of the forest floor or again on a layer of dead leaves. Four to six eggs are laid, but two to three seems to be the usual number of young reared to maturity. The eggs show considerable variation, from pale buffy white to a rich *café au lait*, and even a still warmer, redder tone. Almost all are speckled with dots of white calcareous matter, which are more conspicuous on the darker specimens. They are usually a rather broad oval, smooth and somewhat glossy, and measure from 35 to 38 mm. in breadth, and from 46 to 52 mm. in length, with an average of 36 by 49 mm.

Horsfield's Kaleege is not uncommonly exported from India, and breeds readily in confinement. They live well, and in the case of seven individuals in the London Zoo the average length of life was almost four years, while one bird lived for nine.

Stuart Baker probably knows the Black-breasted Kaleege better than any living white man, and also knows how to put his knowledge upon paper, and I cannot refrain from quoting, from his account in the 1917 volume of the "Journal of the Bombay Natural History Society," both his description of the haunts of the bird and of his most successful day's hunt. "The nest is nearly always placed in forest, and the class of forest most often chosen is the damp evergreen forest met with everywhere along the foothills and broken ground bordering the higher ranges of the Himalayas. Inside these mighty forests, composed of an endless variety of trees, mostly tall and mostly covered with a luxuriant motley of parasites of all kinds, but also with a plentiful undergrowth of canes, brambles and other plants, the Black-breasted Kaleege has its favourite haunts. Occasionally in their inner depths one may come across tiny green glades in the general dense undergrowth. Here the vivid green moss seems even more green than elsewhere, forming a springy carpet; ferns grow here and there over its surface, and the sun only comes to it in dappled, quivering patches through the branches high overhead. Such spots are much beloved by the Kalij Pheasant, and many a time have I come across its nest in the bushes immediately surrounding them. Comparatively open spots of this description attract numerous insects, and I am afraid it is these, rather than their special natural beauty, which induces the pheasants to commence their domestic duties within easy reach of them. The nest itself is more often than not placed in some tangle of bushes, briars or canes at the foot of one of the bigger trees, well concealed from inquisitive friends and enemies, and in some position less moist than its surroundings. Ravines with mossy, fern-covered sides are often selected, and in such places a rock or boulder may form its principal shelter. As a work of art the nest is a failure: a heap of leaves and rubbish scratched into a heap, with a rough depression in the middle for the eggs, is the limit attained, and Mother Nature herself, and not the birds, is responsible for all the collecting that has been done. The great buttresses of the cotton-tree (*Bombax malabarica*), which project on all sides from the main trunk, form recesses into which the winds from every quarter blow their quota of fallen leaves and other oddments, and thus become splendid places in which birds may lay their eggs, and many a nest have I seen, both of this pheasant and of other game-birds, in these cosy corners.

"As far as I remember, six brace of Kalij Pheasant is the biggest bag I have ever made of these birds, and this was made over practically the same ground as that which is described in the article on jungle-fowl shooting in the last number of the 'Journal.'

"As a rule, when shooting along these mustard fields bordering the Kopali River one got two to three jungle-fowl to one pheasant, but this time the reverse was the case.

"My companions (on the occasion of which I write) consisted of a Mikir tracker and a second Mikir with my rifle, and an odd man to work as beater, jungle cutter, luncheon carrier, etc. This was quite enough for all the beating we should require, for the strips were mostly narrow bits along the banks, shut in on one side by very heavy evergreen forest, and on the other by the shingly banks of the stream. Starting just after daybreak, our first *jhum*, or open bit of cultivation, was occupied only by some jungle-fowl, who were the first to detect our meeting, and gave no chance of a shot, but as we passed through the next bit of forest, a hasty but lucky shot right and left brought down two fat, bronze-backed imperial pigeon, and some quarter of a mile further on we came to a second mustard field. In this we could see some birds feeding about half-way down, though we could not make out exactly what they were in the tall mustard. Leaving my men under cover, I went forward inside the jungle about twenty yards, and when I judged I had gone far enough, notified them with a low whistle to come on. Sneaking along just inside the fringes of forest, I kept about the same distance, or a little more, ahead of the men, and when, frightened by the latter, the pheasant got up, had an easy right and left, adding two more pheasants to the bag. My next shot was at a hen jungle-fowl, as she scurried through the mustard into shelter, just giving me a momentary glance as she left the former. Picking her up, we then went on through a patch of semi-burnt cane and grass, missing an old cock jungle-fowl as he got up with a cackle and tremendous flurry on the far side of some charred canes.

"Two more long snap-shots at running birds are tinkered, and then I have a bit of luck, for we step out of the jungle into a mustard field, right into a family party of Kalij, who are scratching round for food just outside the forest. Quite overcome by the suddenness of our appearance, the birds, six in number, take at once to flight, scattering in all directions, but two drop to my shots, and two others who have gone towards the stream are turned back by the sight of some men fishing, and wheel around to their original cover, giving me splendid overhead shots, and both coming down tremendous thumps in response thereto. One of these, however, is a runner, and for some time evades my men in their efforts to catch her, until at last a luckily flung stick bowls her over as she dodges from one bush to another.

"So we wander on, now through a bit of virgin forest, now through a mustard field, and then through a piece of burnt grass, the black surface showing the pugs of a tiger who has passed by some two or three hours earlier. We follow them to the stream where the tiger has had his drink, and then return to the forest, in which we soon loose all trace of him.

"Changing my rifle once more for the smooth bore, and leaving stripes to rest in comfort, we turned and worked down the opposite side of the stream towards camp. The first birds we put up are some jungle-fowl who have been drinking before retiring into the forest for their midday siesta. As they fly past us I knock the tail feathers out of the cock leading them with a real bad shot, and bring down a second with a straighter one. The tailless cock and the others have gone down in the jungle just ahead of us, so, spreading out, we walk them out toward the next *jhum*, every now and then hearing them as they hurry forward, rustling over the fallen leaves. Before we get to the edge of the jungle they have cleared off, without giving another chance, but a single cock Kalij, which has tarried a little longer than the others, gets up just as we too emerge from the trees, and is promptly bowled over and gathered. The mustard here is so high—up to our waists—that we may find some birds lying up in it, and accordingly we work through it in line, myself on the inside next the forest, and a few yards ahead of the men. Within the next few minutes two birds run through the mustard, and gain the jungle in front of me without giving a chance, and then a barking deer jumps up and comes bounding past me about forty yards off, barking as he starts, and barking again as he gains cover and stands inside, defying me. He is still barking as we pass where he stands, and I can hear the stamp of his forefeet, before panic again seizes him and he dashes further away into the depth of the forest. Nothing more shows up until I have reached the end of the mustard, and stand on the yard or two of bare ground which separates it from the nearest trees. As the men come nearer two or three jungle-fowl flit across it, and then there is a tremendous commotion as nearly a dozen birds, jungle-fowl and pheasants mixed together, rise into the air. A hasty shot at one of the former not only knocks it over, but also accounts for an unlucky hen pheasant which has come into the line of fire, and a second shot brings to bag another hen pheasant, which falls, a cloud of flying feathers, with a bang right on to the man with my luncheon-basket. After he has righted himself and collected my scattered provisions, we proceed on our way, and by noon, when we stop to have a rest and lunch, I have managed to bag twelve pheasants, six jungle-fowl, three imperial pigeon, and a couple of very evil-smelling white-eyed pochard, which, however, are not disdained by the coolies."

DETAILED DESCRIPTION

ADULT MALE.—The plumage in general is black, strongly glossed with purplish blue, especially on the upper surface, the posterior ventral plumage being almost dead black without the metallic gloss. The only decided colour character is found on the feathers of the back, rump and shorter upper tail-coverts, which have a very conspicuous white fringe of a normal width of about 5 mm. Throughout most of the western part of the range this varies but little, but to the eastward in many individuals we find a tendency toward the disintegration of this fringe. It either becomes narrower, or else the basal part is broken by dark mottling. Correlated with this there is often an extension of white as a very narrow terminal border over the inner, median wing-coverts and tertiaries and the longest tail-coverts. About fifty per cent. of the individuals have the extreme hidden bases of the median tail-feathers obscurely but thickly vermiculated with dirty white. This is almost invariably the case with birds from northern Burma east of the Irrawaddy, where the vermiculation often extends an inch or two beyond the visible portion of the feathers. The variations occurring along the geographical junction with *nycthemerus* and *lineatus* are multitudinous, and often asymmetrical, reflecting the widespread hybridization with these species.

The crest is long, rather thin and partly disintegrated. The primaries are brown;

the secondaries and tail-feathers black, glossed with blue only along the visible margins. The bill is usually greenish horn colour, paler toward the tip and darker basally; facial skin scarlet; irides brownish hazel; legs and feet variable, sometimes leaden blue, again light horn colour, brown or fleshy. Length about 580 mm.; bill from nostril 18; wing 221; tail 230; tarsus 75; middle toe and claw 60; spurs about 22 mm. The tail is the most variable of all these measurements, averaging longer in eastern birds. Weight from 2½ to 3½ lbs.

Adult Female.—As the females of *albocristatus* are paler of hue, and those of *melanonotus* more melanistic, so the females of *horsfieldi* tend toward erythryism, being on the whole more rufescent than the others, but great variation exists between fully adult birds shot in the same district.

In general the colour is a rich olive-brown; tip of the crest rich rufescent; sides of the head and neck greyish toward the tips; chin and throat whitish; body and wings decidedly rufescent; wing-coverts and ventral plumage tipped with paler colour, sometimes very conspicuously; ventral surface with brownish-white shaft-streaks; rump and upper tail-coverts paler olive brown; centre tail-feathers and often the longest tail-coverts deep ferrugineous, unmarked, or finely vermiculated with dusky. Primaries brown, darker on inner webs, tinged with olive on the outer webs; secondaries and tertiaries much more rufescent, either plain or finely speckled with paler toward the tips.

Facial skin crimson; irides hazel; bill greenish, darker at base; legs and feet variable as in the male. Length, 530 mm.; bill from nostril, 18; wing, 210; tail, 210; tarsus, 72; middle toe and claw, 55 mm.

Young Male.—Much like the female, sometimes indistinguishable, sometimes darker. The succeeding moults gradually eliminate the brown and replace it with black pigment, and a bird of the second year may be fully adult in appearance or with every feather stained with immaturity.

EARLY HISTORY

Latham introduces us to this kaleege in 1823, under the name of the Sylhet Pheasant. His only remarks are, "Inhabits India, brought from Sylhet, in the Province of Bengal, by Sir J. Anstruther." Gray, six years later, repeated the description and gave to the bird the name of *lathami*. As his description is not exact, he doubtless had in his possession one of the wild hybrids. G. R. Gray named it *Gallophasis horsfieldi* in 1845, and gave an excellent plate of the cock. The first live birds were placed on exhibition twelve years later.

SYNONYMY

Sylhet Pheasant Latham, Gen. Hist. VIII. 1823, p. 208.

?Phasianus lathami Gray in Griff. ed. Cuv., III. 1829, p. 26.

Gallophasis horsfieldi Gray, Gen. Birds, III. 1845, p. 498, pl. CXXVI; Mitchell, Proc. Zool. Soc. London, 1858, p. 544, pl. 148, fig. 2, pl. 149, fig. 1; Sclater, Proc. Zool. Soc. London, 1859, p. 205 [24 days incubation]; Sclater and Wolf, Zool. Sket. 2, 1861, pl. 39.

Euplocomus horsfieldi Blyth, Cat. Mus. As. Soc., 1849, p. 244; Hume, Stray Feathers, VII. 1878, p. 429.

Euplocamus horsfieldi Sclater, List of Pheas. 1863, p. 9 [Assam, Sylhet]; Gray, List Gallinae Brit. Mus., 1867, p. 33; Gray, Hand-list Birds, II. 1870, p. 260; Elliot, Mon. Phas. II. 1872, pl. 20; Hume and Inglis, Stray Feathers, V. 1877, p. 42 [Cachar]; Hume and Marshall, Game-birds India, I. 1878, p. 198, pl.; Fasson, Stray Feathers, IX. 1880, pp. 203, 205 [Chittagong Dist.]; Sclater, List Animals in Gardens Zool. Soc., 1883, p. 486; Hume, Stray Feathers, XI. 1888, p. 303 [N. Arrakan, Manipur, Assam, Sylhet and Cachar]; Oates, ed. Hume's Nests and Eggs, III. 1890, p. 416; Mitchell, Proc. Zool. Soc. London, 1911, p. 522.

Euplocomus cuvieri Hume and Marshall, Game-birds India, I. 1878, pl. only.

Gennaeus horsfieldi Grant, Cat. Game-birds Brit. Mus., XXII. 1893, p. 302; Grant, Hand-book Game-birds, I. 1895, p. 269; Oates, Game-birds India, I. 1898, p. 334; Blanford, Fauna Brit. India, Birds, IV. 1898, p. 92; Sharpe, Hand-list Birds, I. 1899, p. 35; Nehrkorn, Katalog der Eiersammlung, 1899, p. 193; Inglis, Jour. Bombay Nat. Hist. Soc., XII. 1899, p. 676 (Hylakandy Dist., Cachar); Baker, Jour. Bombay Nat. Hist. Soc., XII. 1899, p. 487 (No. Cachar); Oates, Cat. Birds' Eggs Brit. Mus., I. 1901, p. 55; Oates, Ibis, 1903, p. 102 (Bhutan and Assam to Chittagong, Manipur and Upper Burma); Rothschild, Bull. Brit. Orn. Club, XIV. 1904, p. 58 (hybrids); Baker, Jour. Bombay Nat. Hist. Soc., XVII. 1907, p. 971 (Khasia Hills); Ghigi, Mem. Acad. Bologna (6), V. 1908, p. 144; Harrington, Jour. Bombay Nat. Hist. Soc., XIX. 1909, p. 309 (Bhamo Dist.); Finn, Game-birds India and Asia, 1911, p. 71; Beebe, Zoologica, I. No. 17, 1914, p. 320; Watson, Jour. Bombay Nat. Hist. Soc., XXIII. 1914, p. 159 (male caring for young); Baker, Jour. Bombay Nat. Hist. Soc., XIII. 1915, p. 669; Stevens, Jour. Bombay Nat. Hist. Soc., XIII. 1915, p. 723.

Euplocamus horsfieldi Tegetmeier, Pheasants, 1904, p. 227.

Gennaeus prendergasti Oates, Jour. Bombay Nat. Hist. Soc., XVII. 1906, p. 10; Ghigi, Mem. Acad. Bologna (6), V. 1908, p. 144.

Gennaeus batemani Oates, Jour. Bombay Nat. Hist. Soc., XVII. 1906, p. 11; Ghigi, Mem. Acad. Bologna (6), V. 1908, p. 145; Harrington, Jour. Bombay Nat. Hist. Soc., XX. 1910, p. 327.

Gennaeus mearsi Oates, Ann. Mag. N. H. (8), V. 1910, p. 164.

Gennaeus horsfieldi horsfieldi Baker, Jour. Bombay Nat. Hist. Soc., XXV. 1917, p. 181 (Description, habits).

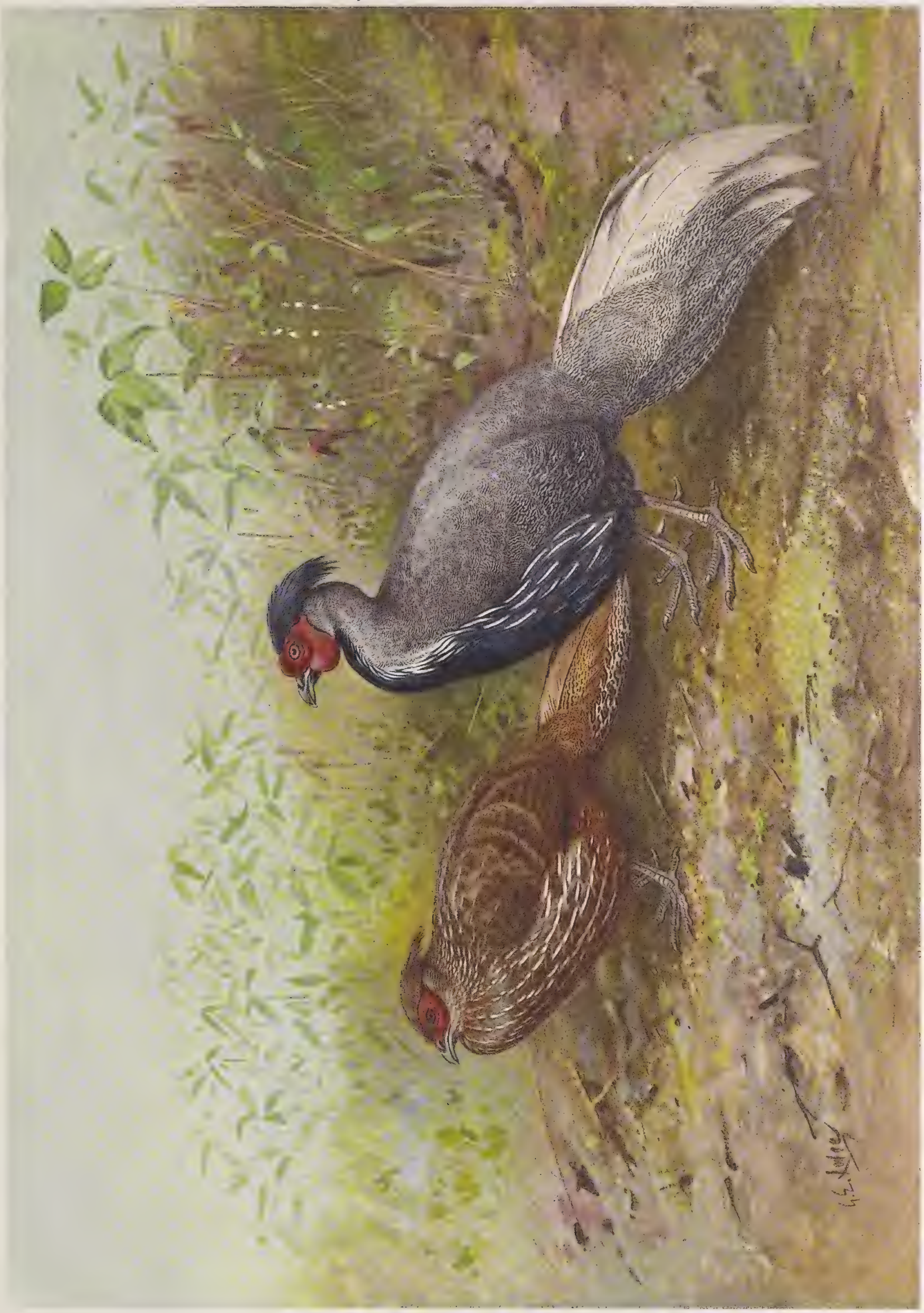
LINEATED KALEEGE

Gennaeus lineatus (Vigors)

A NIGHT spent in slumber on the branch of a tree ; an early morning drink and search for food ; a midday siesta ; again a feeding period and in the cool of early evening a leisurely stroll to water and thence to roost ; such is the epitome of the daily life of the Lineated, as well as of most other pheasants.

They can be located often by the sound of their scratching among leaves, or the low, undertone clucks and chuckles as they search for grubs or succulent tubers.

PLATE XXVI.



LINEATED KALEEGE.

LINEATED KALEEGE

Gennaeus lineatus (Vigors)

NAMES.—Generic: *Gennaeus*, from the Greek *γενvατος*, noble or proud, probably with reference to the bird's carriage. Specific: *Lineatus*, Latin, striped or lined. English: Lineated or Vermicellated Kaleege. French: Faisan de Regnant; Houppifère rayé. German: Strichelfasan; Graufasan. Vernacular: Yit, Kayit, Kanayit (Burmese); Sinlouk (Talaing); Poogik, Phooyk (Karen).

BRIEF DESCRIPTION.—Male: Upper plumage vermiculated finely on exposed parts, more coarsely on basal areas, with black and white in equal amounts; long crest and under parts black, sides of breast and abdomen with white shaft-stripes; central tail-feathers creamy-white on inner web and at tip. Female: Olive-brown above with pointed white shaft-stripes on the neck and mantle, usually split basally into a V-shape, sometimes simple lines; secondaries mottled with buff on outer webs; chin and throat greyish white; under plumage chestnut; all the feathers with white shaft-stripes, and dark cross-bars on the abdomen; middle tail-feathers buff, mottled with black on outer web; others barred with black, white and chestnut.

RANGE.—Valley of the Irrawaddy in Central and Lower Burma, eastward to the Shan States and north-east Siam, and south some distance into Tenasserim.

GENERAL DISTRIBUTION

THE centre of distribution of the Lineated Kaleege is central and southern Burma, especially east of the Irrawaddy. While its northern boundaries fade gradually into the maze of hybrids, apparently typical specimens have been taken as far north as 24° north latitude. From here southward the Irrawaddy may in general be taken to mark its limits, although many birds have been shot on the western slopes of the river valley, especially from 21° southward. At 18° three typical males have been secured on the western slopes of the Arakan mountains. On the east it ranges well into the Southern Shan States, probably touching the range of *nycthemerus* at many points, and has been recorded east of the Salween at about 20° north latitude. How far into Siam it ranges we do not know, but at least as far as 12°. To the south we may include all of the Pegu east of the Irrawaddy and Tenasserim as far as Tavoy in 14° north latitude.

Within this area, often at the higher altitudes, averaging about two or three thousand feet, appear occasional individuals of what has been called *sharpei*, a form which I cannot even tentatively admit as a species.

GENERAL ACCOUNT

Like most of the kaleege pheasants, the Lineated is not a bird of widely ranging habits. When it finds satisfactory haunts, with food, water, good roosting trees and freedom from molestation, it will spend its entire time within a remarkably limited area, disappearing into the deeper, more isolated parts of the jungle only at the breeding season. Also, like its congeners, it prefers mountainous or at least hilly country to flat plains or grassy prairies, although it lives at moderate elevations and never ascends to the heights that the silver pheasant or some of the Himalayan kaleege attain. Dry, well-drained terrains, coupled with a fairly cool climate, are ideal conditions for the Lineated Kaleege, open forest in the neighbourhood of water affording them all that any pheasant could desire.

This bird has been recorded from an elevation of over four thousand feet and from sea-level, but these are above and below its usual haunts, and the great majority of the species doubtless spend their lives between a thousand and twenty-five hundred feet.

Leaving the fast-drying plain of the Irrawaddy, with its cactus and water-lilies, the latter striving to ripen their seeds before their lagoons disappear, the former storing every drop they can absorb against the coming dry season, we approach the purple outlying hills of the Shan States. These rise abruptly from the plain, usually as a small, transverse spur jutting out from the regular north and south range. One passes many small rivulets and waterfalls pouring down to the plain.

Even at a thousand feet the flora has completely changed. At thirty-six hundred feet (Maymo) a dense growth of small oaks and chestnuts alternates with the curious "Nelly" fruit-tree, larch-like at a distance, and what appear to be familiar hickory-nut trees. Pines scent the air, and occasionally we come upon a whole forest of them. Blackberries are ripening at the end of the rains, and now the Lineated Pheasants come occasionally into the less-frequented lanes and roads, picking the berries from the bushes or scratching up the mould at their base for grubs. This is always in the early morning, and close approach would not be difficult were it not for the blossom-headed parrakeets which fly off screeching, spying one from afar and warning every pheasant to take to shelter.

Lineated Kaleege are not gregarious, even to the extent of the white-crested species, but, on the other hand, they are by no means solitary birds. At times other than the breeding season isolated individuals, especially old cocks, may be found feeding and roosting alone, and hens may occasionally appear to be living by themselves. But the family ties and the lure of certain routes to water are two factors which serve to bind together, however loosely, the birds of related blood or of a limited neighbourhood. When concentrating on these birds, one may come across as many as fifteen in a day's search, but this is unusual. As in the case of most of the other kaleege the family ties are strong, and the usual parties of three to seven are often composed of parents with the brood of the year.

A reliable index of the amount of sociability among most birds is the rare or more frequent use of the voice, and with this in mind it is surprising that kaleege are not more gregarious than they are. They may truly be called voluble, and seem to enjoy exercising their vocal organs at all times of the day. I have heard them thus conversing or calling, both on their perches before descending and after retiring, on low branches when resting in the heat of the day, when feeding, and when on their way to water. The loud call, which is also the note of suspicion and even alarm, is the familiar, long-drawn-out, liquid gurgle, preceded by several guttural or mumbled sounds. When carefully stalking birds, and this loud, startling cry comes from the underbrush apparently at one's elbow, the effect is always that of an electric shock, and the one note is almost as difficult to vocalize as the other. Major Nisbett has sent me the following as approximating his idea of it—

Wurk-urk-urk-uk-si—ie! urk-urk-uk-si—ie!

This is the utmost that our alphabet will achieve, and if one has listened to a captive kaleege of any species, he will instantly appreciate the attempt.

When the pheasants are suddenly alarmed so that they take to wing, their outcry is a shrill squeaking, much like rubbing a wet cork on a bottle. This is more recognizable as the syllables *Whe-ech-cheech-che-ech!*

The most interesting phase of their volubility is when they are feeding quietly together or preening their feathers. On several occasions when I had cached myself with such care that my presence was wholly unknown to the birds, I was able to listen to the intimate conversation of a family. Even my coarse hearing could discover the modulations and inflexions, but to no human ear is given understanding or appreciation of the extent of the ideas or sensations thus conveyed. I remember one bird, busily scratching and feeding, which appeared to be talking wholly to itself. No other was within several yards. As it scratched the mould and leaves it was silent, then, when it began to search for the edible results of its energy, it murmured continuously in a low undertone, which rose and fell, gained in strength and timbre, or actually broke into short, isolated grunts, according to the excitement of the discovery and chase of the insects and other creatures upon which it was feeding.

While the Lineated is not a stronger flier than others of its family, it rises easily, and is able to continue for a sufficient distance to carry it well beyond ordinary danger. When flushed by the sudden rush of a dog, or an undetected approach of a beater, the bird will shoot across a valley with strong, rapid wing-beats. Whenever possible it directs its flight downhill and scales as much as the force of gravitation will permit. The tail is usually held low, and only when suspicious of danger does the bird draw itself up to full height on its very toes, and search every direction.

DAILY ROUND OF LIFE

A night spent in slumber on the branch of a tree; an early morning drink and search for food; a midday siesta; again a feeding period, and in the cool of early evening a leisurely stroll to water, and thence to roost—such is an epitome of the daily life of the Lineated, as well as of most other pheasants.

These birds are omnivorous, and they seem to thrive equally well on a wholly vegetable diet, or one which embraces only insect and other animal food. They are inveterate scratchers, and to listen for the loud rustling of leaves is one of the commonest modes of detecting their presence. When a family of pheasants is accustomed to haunt any definite portion of jungle, daily inspection of this area will reveal the considerable amount of energy expended in this search for food. If this investigation be carried on at midday, when the birds are resting quietly, there will be little chance of disturbing them or driving them elsewhere. They seem to have favourite spots in the open jungle floor, and day after day will enlarge the borders of this scratched-over area, which is doubtless chosen because of the abundance of some particular food. Another habit, which I have both observed and have had reported to me, is that of scratching around stumps or the trunks of fallen decayed trees, and often the bark itself will be detached in large flakes, probably by strenuous pecks of the bird's bill.

Nisbett and Payne report that the birds fatten very noticeably when they take to feeding on certain foods, such as when there is an unusually good crop of a small species of chestnut. Among other vegetable items found in their crops are small, tuber-like roots and jungle yam. If these are small they are swallowed whole; if of larger size they are pecked to pieces, a habit which is very common among the argus pheasants. Besides these the Lineated Kaleege eats jungle berries and seeds, fruits, flower petals, fern fronds, young leaves, grass and bamboo sprouts. Nisbett says that he has never found any grain in their crops, although he has known them to feed on the edges of fields containing rice, maize and millet. As to this habit of approaching human habitations or areas of cultivation, the habits of the Lineated seem to differ in various localities. Some observers report it as among the shyest of birds, never being found within several miles of any native hut or village, while elsewhere it seems to spend much of its time feeding near fields. It is generally agreed that it does not object to unfrequented trails, and a half-dozen sportsmen have spoken of finding the best shooting while walking along these jungle paths. The insects taken most frequently are the non-flying, jungle-inhabiting forms, such as caterpillars, grubs, and of course the ubiquitous termites or white ants.

The pheasants roost in small trees and on slanting bamboos, usually selecting places which would be difficult of access to civet cats and arboreal carnivores. The finding of regular roosting-places proved to be only a little more difficult than the locating of birds' nests in general. The search was made possible by the conspicuous sign, the good-sized piles of which often indicated the long-continued use of one particular spot on a certain branch. In the vicinity, sometimes in the same tree, were usually the roosts of other birds, two or three close together, or singly. In these separate instances the number was too great for a single family, indicating that the fragile flocking instinct which drew the birds together on their search for water, was maintained throughout the hours of sleep. The roosts were almost always on rather slender bamboos or tenuous branches, perhaps guarding against the unheralded approach of a carnivore by the vibration of the thin branch.

Personally I failed to observe any convoying of Lineated Pheasants by jay-thrushes or other birds, but both Payne and Phillips have reported this to me as a common association, a fact of no unusual moment when we remember the universality of its occurrence among other species of the genus. As to enemies, I can present no direct data, but it is safe to mention wild cats, civets and martens as in the front rank. Their method of escape from danger varies with the character of the attack. A sudden alarm by dog or man will send the birds up and away at once, flying above the trees if out over a valley, or low and swiftly between the trunks in the jungle itself. When prepared for the appearance of a dog, the pheasants fly at once into the nearest tree, and sit there cackling softly, watching their disturber until he goes out of sight, or ready to fly at once at the approach of his master. In any event the birds are exceedingly difficult of observation by direct approach, but extremely easy if one conceals oneself in the line of their advance down a hillside or nulla.

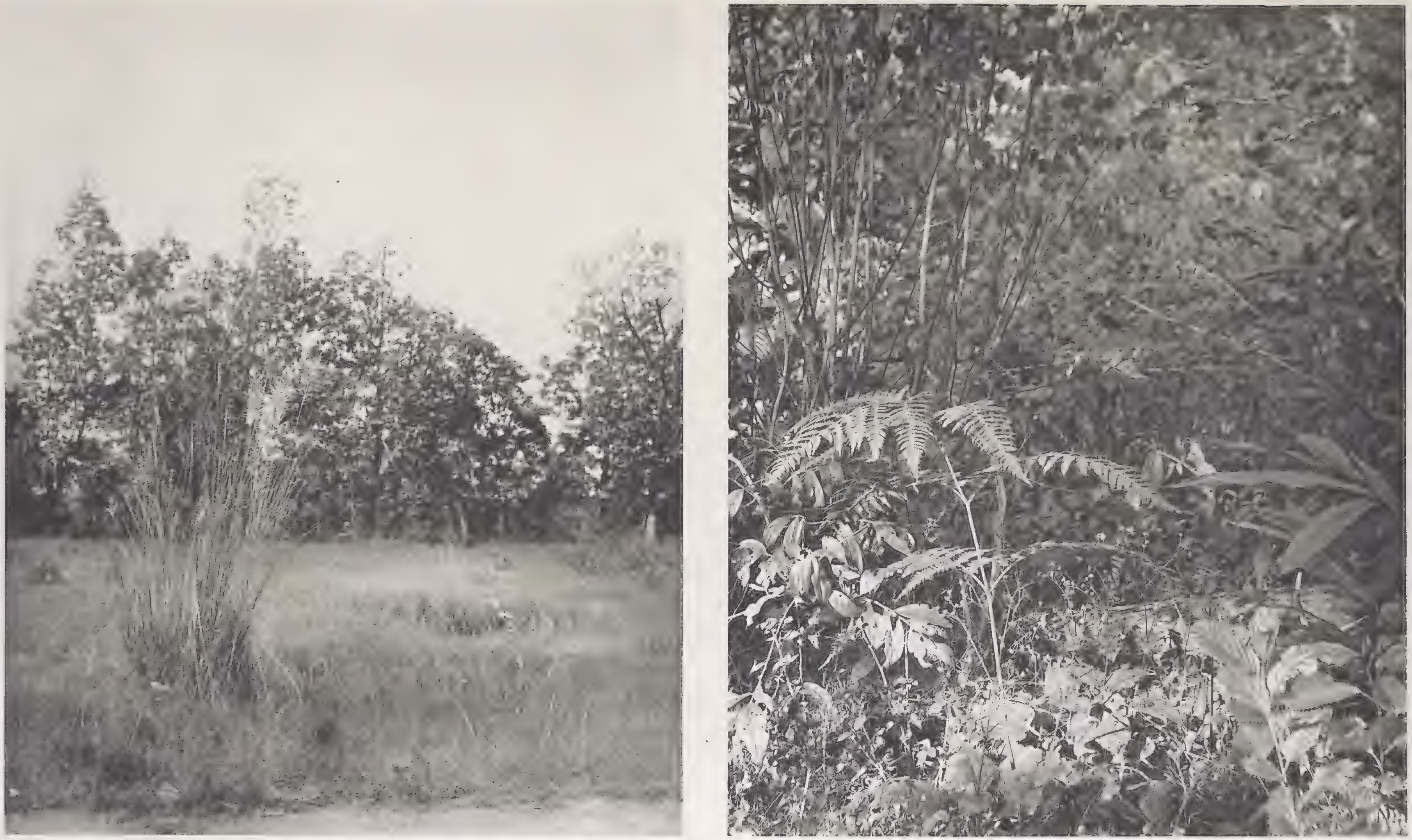
HOME LIFE

Although within the twenty-five hundred feet of elevation, and the ten degrees of latitude of distribution the Lineated Kaleege encounters many changes of climate,

HAUNTS AND BREEDING-GROUND OF THE LINEATED KALEEGE

In central Burma, east of the Irrawaddy we find a dense growth of small oaks, chestnuts and pines. Blackberries ripen at the end of the rains, and the Lineated Pheasants come into the grassy fields for berries and grubs. In the early morning it would not be difficult to approach closely, were it not for the flocks of blossom-headed parrakeets which fly off screeching, spying one from afar and warning every creature within hearing.

PHOTOGRAVURE PLATE 23



HAUNTS AND BREEDING GROUND OF THE LINEATED KALEEGE

the breeding season varies but little. The average is about the end of the first week in April, while two weeks in each direction from this date will cover the majority of the more advanced and delayed nesters. March 16, as recorded by Bingham, is early, while an August record doubtless reflects the unseasonable efforts of a bird whose first nest had been destroyed. I have no faith in the occasional assertion that this species rears two broods.

The loud call, while heard throughout the year, is more frequently uttered before and during the breeding season, and very probably plays a part, however subordinate, in challenge and courtship. The wing music is of much greater importance, and is pre-eminent as a challenge. It is a very simple matter to lure cocks within sight, by even a rather crude imitation. The usual native custom is rapidly to twist a small stick, with a bit of stiff leaf or cloth inserted at the top. While, as I have already said, this wing-beating seems to express many emotions, that of arousing jealousy of a rival is the dominant one.

When about to give this instrumental challenge the bird stands very erect, with tail rather depressed, and, instantly spreading wide its wings, rapidly whirrs them back and forth throughout a rather small arc. It is a very restricted segment of a circle when compared with the similar, but greatly exaggerated effort resulting in the drumming of our ruffed grouse. The wing-whirr of the kaleege—and this may be taken as true of all the species—is markedly ventriloquial. When it seems low and subdued it yet has a penetrating quality which will carry it far through jungle and underbrush.

I have heard it both subdued and again loud and reverberating, but never to the extent described by Colonel Tickell, who says, "The noise in question is the most extraordinary and the most unnatural—that is to say, the most unbirdlike, I have ever heard. I was one day, in the cold season of 1859–60, looking out for a rhinoceros in the hills which skirt the eastern limits of the Tenasserim provinces. Some very recent marks of the animal were pointed out to me by my Karen guides, and, following the traces through the jungle down the hillside, I was at last brought up by a profound ravine. While some of my party left me to reach the bottom of this dell by a more circuitous and practicable route, and I remained perched on a steep declivity, a singular reverberating sound reached my ears, proceeding apparently from the deep valley below me. It was a tremulous, subdued noise, as if the mountains were shuddering in an ague fit, and I, who was thinking of nothing but rhinoceroses at the time, and had made up my mind to see a host of them emerge from the dense jungle as the result of so strange a symphony, was utterly amazed by my Karen companions telling me the noise was made by the 'Yits' (hill pheasants). I could not help smiling at such a singularly literal illustration of the fabled mountain in labour with the *nascitur ridiculus mus* enacted by these funny birds. I have only on that occasion heard this extraordinary sound, though for weeks at a time journeying and living in forests abounding in hill pheasants."

The tremulous quality identifies it at once as the challenge of a kaleege, but it would require a vivid imagination to picture a rhinoceros as its author. While the kaleege as a whole are pugnacious, yet there seems no reason to think that the

Lineated excels in this respect. In regard to captive birds I have found that it is wholly a matter of individuality. Some males will not tolerate a female of their own kind at any time of year, while others show but little objection to the presence of other cocks even at the breeding season. No one seems to have witnessed a battle between wild birds, but sorely wounded specimens have been found under circumstances which left no doubt of the *raison d'être*. As the result of widespread inquiries among sportsmen I could only elicit the information that the fighting took place chiefly in March and early April, and in morning and late afternoon. In addition to the whirring of the wings, Major Nisbett tells me that the birds make a clapping noise by striking the backs of the wings together. This performance, so characteristic of fowls and pigeons, I have never heard from any kaleege, and it certainly must be but rarely produced.

There can be little doubt that the Lineated is normally monogamous. The frequent association of the birds in isolated pairs is strong circumstantial evidence, and the final proof is the not infrequent record of both parents seen with a single brood. On the other hand, if females are numerous, a cock is not unwilling to consort with two or three.

I did not find the nest of this kaleege, and my information is derived from the data of Majors Nisbett, Harington and other excellent observers. Nests have been found throughout the entire extent of elevation from sea-level up to over two thousand feet. The location is typically phasianine—on the ground in the forest. It may be in a clump of dense bamboo or lower undergrowth, close beside a dead, fallen tree or at the base of a live one. The slight hollow may be a natural one, in which case the natural forest debris of dead leaves, grass or moss is left and gradually felted down into a dense lining by the weight of the bird's body, or it may be scratched out by the hen bird, when the eggs are deposited on the earth itself. Six to eight are the more usual numbers. In the Petchaburi River country, south-west of Bangkok, Siam, Gairdner found a nest of eight eggs on April 3. Judging by the largest number of young seen together, five seems to be the largest brood reared to maturity, while two or three is the usual brood. The eggs are regular ovals, sometimes quite broad, and with considerable gloss. They vary from rich reddish-buff to buffy cream, and the pores are always lighter and often pure white. They measure from 44 to 50 mm. in length, and from 35 to 38 in breadth; the average being 47 by 36 mm.

The period of incubation, judging by captive birds, is twenty-five days. The chicks are strong and run at once. Oates says that he was "fortunate enough to capture portions of four broods. It is astonishing in what a short time the little birds make themselves invisible. It is difficult to secure more than two out of one batch. It is a case of pouncing on them at once or losing them. The mother is a great coward, running away at the slightest alarm, and thus contrasting very unfavourably with the jungle fowl, which keeps running round and round the intruder with great anxiety till her young ones are in safety."

This latter statement, I think, is based on an individual performance, as my experience with closely related species of kaleege seems to indicate that the hens are quite as brave and as good mothers as those of any of the family. The young appear to remain with the parents throughout the autumn and winter, wandering off by themselves only at the approach of the next breeding season. The annual moult occurs about October or November, and while the young birds may breed in the second year, it is sometimes the fourth annual moult before all signs of juvenility are eliminated from the plumage.

RELATION TO MAN

Although partial to lonely trails which pass through the jungle, and occasionally feeding along the borders of cleared fields, yet Lineated Pheasants do not like the haunts of mankind, and prefer the undisturbed quiet of isolated regions. They will not, however, desert a place at the first appearance of civilization, and may be shot for a year or two at comparatively short distances from recently-built rest-houses. They remain even longer in the vicinity of a new native hamlet, where, in the end, the trapping of the birds results in an even more thorough elimination.

Kaleege are taken both in spring-traps and by means of decoy birds. These are surrounded by scores of nooses, and the approaching cocks seldom avoid entangling themselves before they reach their supposed rival. I have already spoken of the decoying of wild birds by means of artificially imitating the wing-whirr. Besides the bamboo-stick-and-leaf method, this is achieved by means of a bit of cloth held in the two hands and repeatedly snapped taut. Sometimes two methods are combined, as when the hidden native whirls his stick and thus stimulates the tethered tame bird to wing-whirring, which sound, in turn, attracts the wild cocks.

English sportsmen consider the kaleege as legitimate game, and many are shot both in season and out. The latter reprehensible deed carries its own punishment, for very often the birds are exceedingly lean and tough. In the autumn and winter, after a diet of acorns, they leave little to be desired as an addition to the camp mess.

Accounts differ widely as to the behaviour of the kaleege when hunted, some sportsmen saying it always escapes by running, others that it flies at once. In underbrush, when approached by a man, it certainly always escapes on foot, but the approach of a dog in almost any kind of cover is sufficient to send it up at once into a tree.

While the general range of the Lineated Kaleege is being continually restricted by wholesale shooting and trapping, yet it is protected in all Government reserved forests between March 1 and October 1, and even outside there are many officers and other sportsmen who are as conscientious as if they were on preserves at home.

Full-blooded Lineated Kaleege are rarely to be procured alive outside of Burma, the birds generally showing atypical characters, being captured probably on the boundary of the range of the species, where hybridism has taken place. The first were exhibited in London in 1864. Of nineteen individuals of which records were kept, the average duration of life was a year and ten months, while the extreme was six years and four months. Lineated Kaleege breed readily, and, of course, cross with any species of the genus.

DETAILED DESCRIPTION

Adult Male.—Top of the head and elongated, stiffened crest black, glossed on the exposed portions of the feathers with metallic purplish blue. Contour feathers of the upper plumage finely vermiculated with black and white in equal proportions, so finely on the exposed portions that the general appearance is of a uniform grey. The areas thus characterized are the back and sides of the neck, mantle, back, rump, shorter upper tail-coverts, scapulars, lesser and medium wing-coverts. The alternate lines extend obliquely across the vanes. Basally they become coarser, and the black increases until it is dominant. Primaries and their coverts blackish brown, with irregular, confused white vermiculation. Secondaries black, with narrow but stronger white lines, those on the outer web often split longitudinally. Tertiaries gradually merge into the greyish vermiculation of the back.

Tail of sixteen feathers, moderately long, curved and compressed. Central pair pale buffy-white, except for the basal three-fourths of the outer web, which is vermiculated with fine black lines. On the succeeding feathers this black increases, until about the third pair it becomes dominant, especially on the outer web. On the outer, shorter rectrices the white is reduced to irregular coarse vermiculations on both webs. The tips of the second and third pairs remain clear buffy white, however.

Chin, throat, lower neck and remaining under-plumage black with a faint bluish gloss. Sides of the neck and breast with wide shaft-stripes, confined almost altogether to the outer webs of the feathers. Mandibles greenish horn colour, irregularly blackening toward the base. Nasal cere greyish. Entire facial skin bare, and brilliant scarlet in colour, covered with numerous finger-like papillæ. At the breeding season this brilliant ornament is swollen and extended into three well-marked wattles or projections, one superior and anterior to the eyes, a second at the extreme posterior portion, and the third gular, hanging down below the gape. Lower eyelid pale bluish. Iris hazel-red in fully adult birds at the breeding season. Legs and feet usually flesh-colour, spurs darker. Weight, 2½ to 3 lbs. Length, 630 to 740 mm.; bill from nostril, 23; wing, 250; tail, 290; tarsus, 85; middle toe and claw, 65; spurs, 15 mm.

Variations.—The commonest variation among fully adult birds from well within the limits of distribution, is in the amount of striping on the under surface. From being confined to the sides of the neck and breast, this may extend over all the ventral plumage. The markings of the central tail-feathers are never exactly alike in any two birds. In fully adult males from localities in the very centre of distribution I have seen the entire webs covered with the markings, while from a near-by locality the birds would show the more normal, clear, whitish inner web and tips. When we approach the boundaries we at once begin to see the effects of hybridization—with *horsfieldi* on the north and west, and *nycthemerus* on the east, and the variations as a consequence become innumerable.

Adult Female.—Top of head and long crest rufous brown, mottled with black; remainder of the upper plumage olive-brown, very faintly mottled with black; all of the feathers of the upper and side neck and mantle with a conspicuous white shaft-stripe, slightly bordered with black; many of the stripes are split with brown basally; inner webs of the primaries and secondaries dark brown; outer webs of the primaries olive-brown, and those of the secondaries mottled, and with coarse, broken vermiculations of paler buff along the margins.

Middle tail-feathers yellowish-buff; on the inner webs this colour is clear, with sparse basal dotting of dark brown; the outer webs are brokenly vermiculated with dark brown, basally these marks becoming heavy, oblique lines of chestnut, bordered with black; the second pair shows this latter pattern intensified, while in the next four pairs the buffy background clears to white, and the equality of pigmentation gives the effect of successive oblique bars of chestnut and white, the former bordered strongly with black; the outermost, shortest rectrices are dominately chestnut, with irregular mottling of dark brown on both webs.

Chin, throat and upper neck greyish white; remainder of under-parts brownish-chestnut, deepest on the lower breast; all of the feathers with a narrow shaft-stripe of white, usually bordered with black, and with the feathers, especially of the posterior portions, more or less distinctly cross-barred with black.

Mandibles horny brown, with a varying amount of black pigment, especially toward the base; facial skin scarlet, covered rather sparsely with fleshy papillæ and a very few minute degenerate feathers, and not developed into wattles; irides hazel-brown; feet and legs flesh-colour or brownish; spurs often present, but very small. Weight, 2 to 2½ lbs. Length, 550 mm.; bill from nostril, 20; wing, 225; tail, 225; tarsus, 75; middle toe and claw, 55; spurs never more than 3 mm., and usually a flat scalule.

Chick in Down.—Pale rufous on the forehead, warmer on the crown, with a reddish-chestnut post-orbital line. Reddish-brown above, with two lighter, lateral lines, paling into buffy-white below, the breast being warm rufous.

Immature Male.—Like female, changing slowly to the adult male plumage, which it attains usually in the third year.

EARLY HISTORY

In 1823 Latham gave a good account of this kaleege, which he called the Lineated Pheasant. He says the description was given him by Dr. Buchanan, and was taken from a bird in an aviary in India. Its home was uncertain. No further reference is found until 1831. Vigors than called the bird *Phasianus lineatus*, having in hand a specimen sent from the Straits of Malacca. Lesson, in the same year, re-described it under the name Faisan de Reynaut (*Phasianus Reynaudii*), and in his sole comment, "du Pegu," gave us the first correct information as to its home. Bélanger, in his "Voyages aux Indes Orientales," in 1834, gave two plates of the Lineated Kaleege.

SYNONYMY

Lineated Pheasant Latham, Gen. Hist., VIII. 1823, p. 201.

Phasianus lineatus Vigors, Phil. Mag., 1831, p. 147; Vigors, Proc. Zool. Soc., London, 1831, p. 24; Jardine and Selborne, Ill. Orn., 1836, n.s. pl. 12.

Phasianus reynaudii Lesson, Traite d'Orn., 1831, p. 495; Lesson, in Belang. Voy. Ind. Orient, 1834, p. 276, pls. 8, 9 (Pegu).

Gennaeus lineatus Wagler, Isis, 1832, p. 1228; Gould, Proc. Zool. Soc., London, 1859, p. 150 (Tavoy); Oates, Stray Feathers, V. 1887, p. 164; Anderson, Anat. and Zool. Researches, I. 1878, p. 669; Grant, Cat. Birds Brit. Mus., XXII. 1893, p. 304; Grant, Hand-book Game-birds, I. 1895, p. 272; Blanford, Fauna British India, Birds, IV. 1898, p. 92; Oates, Game-birds India, IV. 1898, p. 351; Sharpe, Hand-list Birds, I. 1899, p. 36; Nehrkorn, Kat. der Eiersammlung, 1899, p. 193; Oates, Cat. Eggs Brit. Mus., I. 1901, p. 55, pl. VI., fig. 5; Rippon, Ibis, 1901, p. 556 (Low Elevations of Southern Shan States); Oates, Ibis, 1903, p. 100; Ghigi, Mem. Acad. Bologna, 6 (V.), 1908, p. 140; Evans, Jour. Bombay Nat. Hist. Soc., XVI. 1905, p. 520; Finn, Game-birds India and Asia, 1911, p. 73; Wall, Jour. Bombay Nat. Hist. Soc., XXI. 1912, p. 460; Hopwood, Jour. Bombay Nat. Hist. Soc., XXI. 1912, p. 1215; Beebe, Zoologica, I. No. 17, 1914, p. 320; Gardner, Jour. Nat. Hist. Soc. Siam, I. 1914, p. 40; Baker, Jour. Bombay Nat. Hist. Soc., XXIII. 1915, p. 675.

Phasianus fasciatus McClell, Calcutta Jour. Nat. Hist., 1842, p. 146, pl. III. (Arrakan ?).

Gallophasis lineatus Gray, Gen. Birds, III. 1845, p, 498; Hume, Stray Feathers, II. 1874, p. 482, (Tenasserim).

Gallophasis fasciatus Gray, Gen. Birds, III. 1845, p. 498.

Euplocomus lineatus Blyth, Cat. Mus. As. Soc., 1849, p. 244 (part); Gray, Hand-List Birds, II. 1870, p. 260.

Euplocamus lineatus Sclater and Wolf, Zool. Sket. 2, 1861, pl. 38; Sclater, List of Phas., 1863, p. 8, pl. 9 (Tenasserim and Pegu); Gray, List Gallinae Brit. Mus., 1867, p. 34; Elliot, Mon. Phas., II. 1872, pl. 23; Hume, N. and E. India B., 1873, p. 525; Gould, Birds Asia, VII. 1875, pl. 14; Hume, Stray Feathers, III. 1875, p. 165, (Pegu Hills, east of the Irrawaddy R.); Fielden, Stray Feathers, III. 1875, p. 168; Hume and Marshall, Game-birds India, I. 1878, p. 205, pl.; Anderson, Anat. and Zool. Researches, I. 1878, p. 669 (West of Irrawaddy above Mandalay); Hume and Davison, Stray Feathers, VI. 1878, p. 436 (Tenasserim); Bingham, Stray Feathers, IX. 1880, p. 195 (Thoungyeen jungles); Oates, Stray Feathers, X. 1882, p. 236 (Pegu); Oates, Birds Burmah, II. 1883, p. 316 (East slope Arrakan Hills (?), Siam, Irrawaddy Valley to Bhamo); Oates, ed. Hume's Nest and Eggs, III. 1890, p. 416; Mitchell, Proc. Zool. Soc., London, 1911, p. 522.

Lophophorus cuvieri Hume, Stray Feathers, III. 1875, p. 166.

Nycthemerus lineatus Blyth and Walden, Cat. Mamm. and B. Burma, 1875, p. 149 (Karen Hills).

Gennaeus lineatus lineatus Gyldenstolpe, Swedish Exped. Siam, 1916, p. 157; Baker, Jour. Bombay Nat. Hist. Soc., XXV. 1918, p. 326.

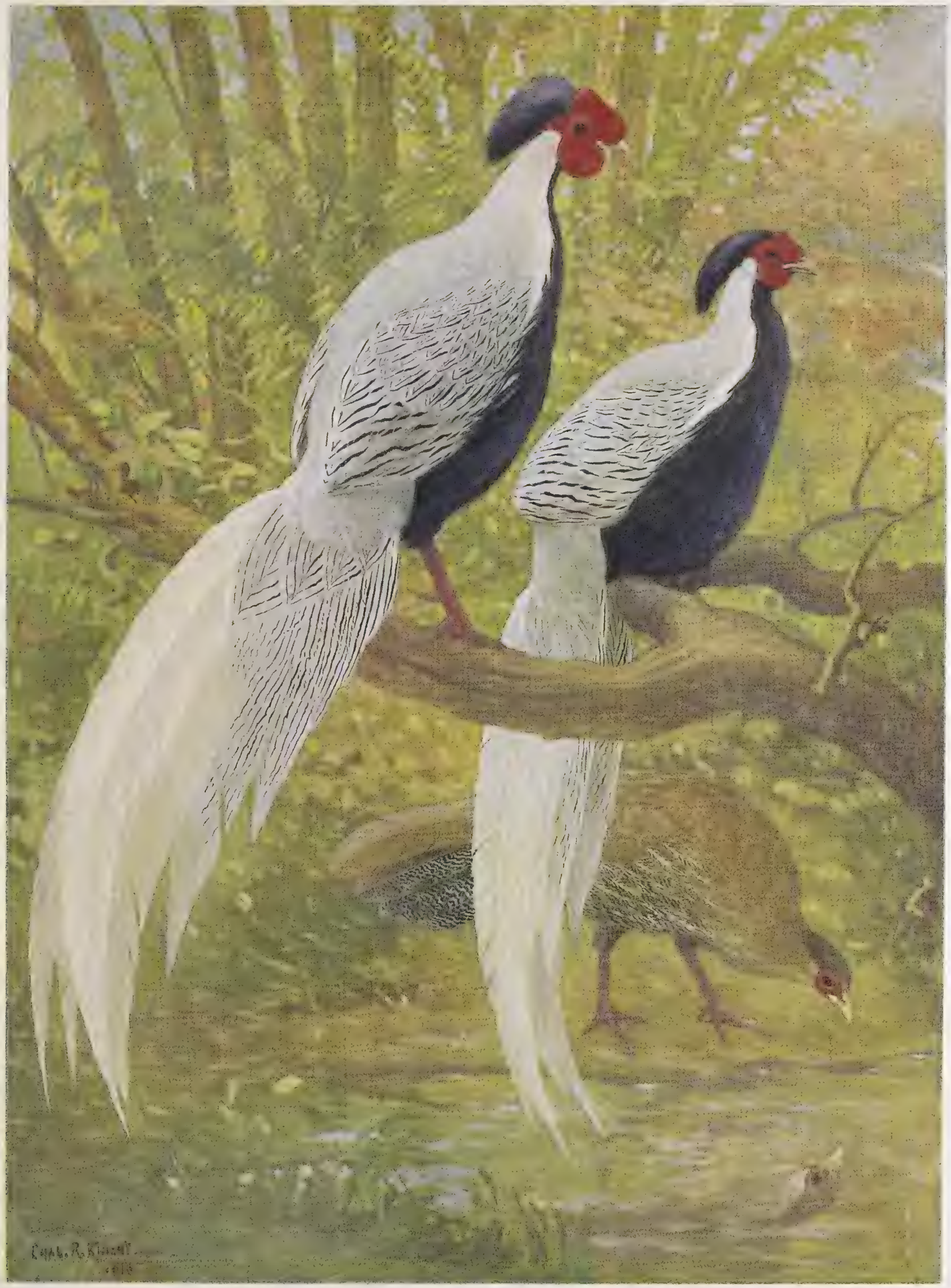
PLATE XXVII

CHINESE SILVER KALEEGE

Gennaeus nycthemerus (Linnaeus)

THIS, the beautiful bird of "day and night," ranges across the whole of south China, from the Burmese border almost to the sea-coast of Fokien. It is found in open forest, on clear, rolling hills and along swift rivers. While the Silver Kaleege is common in captivity, yet no white man has ever seen the nest and eggs of a wild bird. Enormous numbers were formerly killed for their plumage, but now the Chinese have developed a taste for their flesh and trap and shoot the bird extensively.

PLATE XXVII.


CHAS. R. KNIGHT

CHINESE SILVER KALEEGE.

CHINESE SILVER KALEEGE

Gennaeus nycthemerus (Linnaeus)

Names.—Specific: *nycthemerus*, from Greek *νυχθ*, stem of *νύξ*, night and *ἡμέοα* day, an apt simile in the case of its jet black and pure white plumage. English: Silver Pheasant; Chinese Silver Kaleege; French: Faisan argenté; German: Silberfasan; Vernacular: Ing-ky (Silver fowl); Paé-ky (White fowl) Chinese.

Brief Description.—Male: Top of the head, long, hairy crest and under parts black, glossed with purple; upper parts white, the feathers peppered, or on the wings lined, with four to six black, converging lines; tail very long, centre feathers white, others with numerous oblique lines. Female: Crest blackish-brown; throat brownish-white; entire body plumage and central tail-feathers olive-brown, finely mottled with dusky lines; outer tail-feathers black, with irregular oblique white and olive lines.

Range.—South China, from central Yunnan east to Fokien.

THE BIRD IN ITS WILD HOME

It was the ides of March among the tumbled mountain ranges of Fokien. A week's rain had freshened the landscape and swollen each bud and lichen, and under the heat of the midday sun the myriad lives in egg and chrysalid were stirring restlessly. When I left the river bank in early morning the wind blew cold, but after a climb of a thousand feet the sun's warmth seemed that of midsummer. Although frost was almost unknown, yet the air was filled with springy odours, and to the eye Nature revealed herself as awakening after a long winter's sleep.

The hills, ravines and mountains surrounded us, their steep, rounded outlines broken here and there by weathered cliffs of blackish rock. A soft coat of green covered the slopes, but nowhere were the dark spires of forest. Cultivation must be all but impossible here, but the hordes of yellow men of this and countless past generations had gleaned again and again, and left only sprouting pines and brushy bamboo. Grass was almost absent, its place taken everywhere by a low, coarse fern brake, covering densely every available inch from water's edge to mountain top.

I crouched and watched the south side of an open valley. Along the bottom flowed a quiet green stream; here and there were stubble-filled rice fieldlets, most of them of only a few yards extent.

Two beautiful shrikes clung to a reed near by, and now and then flew into a clump of brush, searching for insect food like vireos. They were at last driven away by a flock of black mynas, which whirled down to the fields and began to feed.

Now an interesting sequence of happenings delighted me. A flock of a dozen magpies was searching busily through the ferns on an overhanging bank. Occasionally one flew down and grubbed out a hollow with its beak among the newly-ploughed clods of a small rice terrace below. It dropped something into the hole and carefully covered it up before flying up again. After two or three magpies had repeated this, a hen Silver Kaleege walked slowly out into the field, followed by another hen and a cock, and all scratched vigorously where the magpies had been delving. Good-sized black objects were found and beaten vigorously before being swallowed.

For half an hour this went on, the magpies continuing to bring down objects and bury them ; and the kaleege to dig them up and devour them. Neither species paid any attention to the other. While this was going on, a creamy white, weasel-like animal appeared, winding along below the bank. A bit of earth dislodged by a magpie fell almost on the creature, and it turned and dashed back to shelter.

In order to solve the problem of the magpies and pheasants I crept nearer, but missed in a try for one of the latter. With the second barrel I secured a magpie which had just started to fly down to the field with one of its treasures in its beak. I ran to the fallen bird and found a partly-crushed cock-chafer, or Jung-bug, lying close to it. In the mouth of the bird was a leg of the beetle, and in its crop eight more of the insects. The magpies had been feasting to repletion on the newly-emerged beetles and then, for reasons best known to themselves, had chosen to work hard at burying all the others they could find. The pheasants had come into the field to scratch for food and, having uncovered several of the newly-buried toothsome morsels in the tracks of the magpies, had seemed to realize that these birds were in some way connected with this manna, and for the last ten minutes hardly had the magpie started back for the bank when one of the pheasants unearthed its cache.

GENERAL DISTRIBUTION

Except on the extremes of its range, little is known as to the distribution of the Chinese Silver Pheasant. Throughout Fokien it is common except immediately on the coast. There are definite records for north-west, central and south-east Fokien.

As to the remaining territory in the eastern and central parts of its range, Robert Swinhoe has given us the only definite information. He says, "It is found in the wooded mountains of the following provinces: Fokien, Canton, Kwangse and Kweichou." This brings us to the Yunnan border, where I have evidence of its occurrence in numbers. It is certainly found in central, and more rarely in western Yunnan, and also in the eastern part of the Southern Shan States. This is fifteen hundred miles to the westward of Fokien. It must occur along the south China coast, for in the Island of Hainan we find a closely related form. Elsewhere we may trace its range by the line of hybrids which have resulted from its crossing with *horsfieldi* and *lineatus*. In Yunnan it grades westwardly into darker forms, while in Burma, the Shan States and Annam, we find such scattered hybrids as the so-called *rufipes*, *andersoni* and *beli*, all of which show an unmistakable preponderance of *nycthemerus* blood.

GENERAL ACCOUNT

Like the golden pheasant, the Chinese Silver Kaleege is one of the best known of its group in captivity. The two are still further alike in their isolation in a wild state. While we may purchase a pair of Silvers for a very small sum and be quite certain of rearing numerous young birds to maturity, there is no authentic record of the finding of a nest of the wild birds, and in fact, only the most meagre notes even of distribution.

CHINESE HAUNTS OF THE SILVER PHEASANT

In Fokien, near the borders of Kiangse, the pheasants of "day-and-night" live among wild ravines and mountains. There are no large trees, and the dwarf bamboos and shrubs have been cut again and again by the yellow men for fuel. But here, in company with shrikes and mynas, and a flock of magpies, I found the Silver Pheasant near the rivers.

CHINESE HAUNTS OF THE SILVER PHEASANT.

In spite of numerous repetitions of the fact, there seems to be no definite record of a Silver Kaleege in Chekiang. The Abbé David asserted as long ago as 1877 that it was becoming very rare in its wild haunts, but gave no reason for the statement. In Fokien several naturalists have found it in numbers, and back from the sea-coast I observed it in several isolated parts of the country.

There is considerable shooting and trapping of the birds on the part of the natives, but no systematic collecting for their feathers as I noted in Yunnan. One method reported by the Chinese is to build a rough shelter of boughs and to scatter around it quantities of grain. When the birds have become accustomed to come day after day for food, the hunter conceals himself in the shelter and shoots the kaleege as they come to the food. The dead birds are not disturbed, and by remaining quietly concealed, it is said that as many as eight may be obtained in a single morning. I have described a similar disregard for the noise of gun-fire on the part of related species of Burmese kaleege. The Chinese hunters are also reported to shoot the birds by torchlight from their roosts. It is said that the civil mandarins wear a Silver Kaleege embroidered on the heart and back badges of their official dresses to indicate their rank. It is certainly one of the favourite subjects for decorative painting and embroidery among the Chinese.

The insight which I could gain into their lives showed that their habits differed in no way from other kaleege. I never saw a bird at mid-day, but in early morning and late afternoon their noisy scratching would reveal their whereabouts, and a careful stalk would sometimes give a chance for a shot or a glimpse of white and black plumage. I observed no regularity of movements, no accustomed trail toward water, and so was unable to head them off or intercept them. They seemed to wander about with but little definite direction in view, and I could locate no roosts.

The food of those I examined consisted chiefly of insects, such as grubs and wire-worms, together with a less quantity of various kinds of berries, and occasionally flower petals and leaves. La Touche tells of four eggs brought in by a Chinaman said to belong to the Silver Kaleege. This was in Central Fokien. Two of the eggs were broken. The others measured respectively 48 by 37 and 48 by 32 mm. In captivity the Chinese Silver Kaleege is one of the readiest breeders. Indeed no fewer than seventy-two fertile eggs have been laid by three hens in a season. The eggs are broad ovals, rather glossy and without pigment markings. They vary in ground colour from pale to warm reddish buff, usually *café au lait*, and sometimes with small white spots of lime. They measure from 41 to 54 mm. in length, and 38 to 41 in breadth. The average of many eggs is 39 by 51 mm. From four to six eggs seem to form a complete set, and the period of incubation is twenty-five or twenty-six days.

There is great variation in length of life, some birds dying with no apparent ailment, while others live in perfect health for many years. Records made in the London Zoo show that of thirty-eight individuals the average length of life was a little less than two years, while the maximum was nine and a half years. There are other authentic records of cock birds which have lived twelve, eighteen and even twenty-one years.

Birds both living and dead are brought into the large Chinese cities for sale, such as Foochow, Amoy and Canton. But, as Swinhoe says of the Canton birds, all have been trapped or shot, and I doubt if the kaleege are reared except very rarely by the Chinese.

In Europe and the United States, however, it is one of the commonest of its family with dealers, and is one of the first to be obtained and bred by the amateur. While these birds are beautiful and hardy, their pugnacious habits make it inadvisable to confine them closely with other birds, while even if given the freedom of coverts, they will usually drive off the other species of pheasants. When a pair is allowed to pair and nest, the cock is very faithful in attendance upon the female and in defence of the young, and this unquestionably points to the monogamous habits of the wild birds. The cock, of course, usually has nothing to do with incubation, although there is actually a record of one bird sitting on the eggs. Its mate had laid four eggs, but failed to hatch young. When a second batch was laid, the cock, in fully adult plumage, began to incubate, and so successfully that three young Silvers were hatched, and were reared by the combined efforts of both birds. This is very unusual, however. But the cock vigorously opposes any threatened danger, and will fearlessly launch himself at the head of any one of whom he has suspicions, and has been known to follow a person indoors to continue his assault. The hens are equally brave, and will drive away cats and dogs whenthey are with a brood of young chicks.

As furnishing sport in private preserves they are unsatisfactory, as they are difficult to flush, preferring to escape on foot, and even when they take to wing they merely skim the underbrush, offering little chance for other than snap shots, and these dangerous to beaters and to fellow sportsmen. Birds shot under such circumstances have been described as very inferior in flesh, but two which I had cooked in the field left nothing to be desired. The chief objections to their artificial establishment as game-birds are their tameness and their habit of coming close to houses and gardens.

The wing whirring and courtship are like those of the other kaleege, and the former habit is not confined to the breeding season, but seems to function as a warning signal, and probably in other ways as well. The usual kaleege, broken, semi-liquid, semi-harsh, guttural cry is characteristic of this species.

When courting there seems to be usually a quite definite utterance, combined with a wing whirr. The cock approaches the hen slowly and in an indirect, sidling manner. He then stops suddenly, faces her, stands erect and utters a two-syllabled note, something like *ohr-chac!* short and sudden, the accent on the first syllable. This is instantly followed by an equally short and sharp whirr, thus *ohr-chac* (whirrrrr!) Then the cock runs or walks swiftly around the hen, with tail and wings spread widely, showing them laterally or frontally, according to his position relative to her eyes.

When the wing whirr is given as a note of suspicion or upon some similar provocation, it is usually double, thus, whirr! whirrrrrrrrrrrr! a short, quick beat, followed by a long roll, during which the half-open wings vibrate back and forth in a maze of motion within a small arc at the sides of the body, the bird standing very erect.

As a contrast to my observations made on this pheasant in the extreme east of its range in Fokien, I am glad to quote a few paragraphs written by a correspondent of Stuart Baker's, concerning the bird in the extreme west, where indeed the frequent infusion of *horsfieldi* blood has led to the name *ripponi*.

This observer writes that "in spite of its being found generally in grass, rather than in heavy trees or bush cover, it is not an easy bird to find, and still less easy to bring to bag when once found. One imagines that such a magnificent bird must be extremely conspicuous wherever found, but such is by no means the case, and I have more than once stared at a motionless bird some seconds before I could make it out. The stunted and thinly foliaged oaks, which are scattered about at some distance from each other, give such a queer dappling of light and shade under the blazing Indian sun that the outline of even glaring white objects cannot be made out at once, and the broken black and white of the pheasant's back assimilates well with the waving grass and the shivering, broken shadows of the oak-leaves. Every breath of wind which stirs grass and leaves alters your view, and it is not until the bird rushes headlong away in the open, or skulks, head and tail down like some wild beast, into the nearest raspberry tangle, that you grasp the fact that you have let a pheasant get away.

"Of course, once they are on the wing they can be seen and heard from a great distance, but even under these circumstances I have been sometimes so struck with their beauty that I have failed to fire until too late.

"One of my first encounters with these birds was when, working over the crest of a grass ridge with my Sepoys, we suddenly put up a covey of full-grown birds, and I was so fully occupied in watching these streaks of silver loveliness that I omitted to fire at all, and the whole lot—I think there were seven or eight—disappeared unharmed down the hill into a ravine with trees and dense undergrowth.

"Often we used to hear these pheasants moving in front of us as our scouts worked through the grass on either side of our track. The main body of our men were following, but we very seldom put them up within sight. When we were working uphill they continued to run ahead of us until they had crossed the ridge or crest of the hill to our front, and then, when out of sight, they took to wing with much fluster and noise.

"We noticed they always ran uphill and flew down, and always seemed to make for the highest point in the vicinity before taking to flight.

"As, on the occasion of which I just wrote, we several times came on conveys of full-grown cock birds without a single hen anywhere near that we could see, it may have been that the hens skulked away on foot, but I think not, for the sound of the running birds could be followed very clearly when the grass and fallen leaves were dry and rustly.

"They crowed much like the common English pheasant, but a shorter, deeper sound. I never *saw* them crowing, but more than once put up cock birds from spots where I had heard a vigorous crowing and flapping of wings going on the moment before."

DETAILED DESCRIPTION

Adult Male.—Top of the head and long nuchal crest black, strongly glossed with purplish blue; the crest is flowing, disintegrated and directed backward; it measures sometimes 100 to 110 mm. in length; the length and disintegration is due, not to the elongation and degeneration of barbules on many barbs, but to the specialization of a few terminal ones. In a single feather 85 mm. in length, the shaft is only a third of this length, supporting some forty pairs of short barbs. Then the shaft breaks gradually into a score of barbs, which are tremendously lengthened, and which form the terminal two-thirds of the feather; these are clothed to their very tip with very short, barbicel-less barbules. The transition is very abrupt—there are no barbs of median length; for example, the last of the short barbs may be 6 mm. in length, while the succeeding one is 60 mm., fully ten times as long.

Ear-coverts, sides and back of the neck, and central pair of tail-feathers pure white; remainder of the upper plumage of body and wings white, dotted and lined with black. Mantle, back, rump and all but longest upper tail-coverts, each with five or six narrow, regular, black, concentric lines. In some cases these are solid throughout; or again, they are broken into dots near the apex of the feather, giving the appearance of a distinctly patterned but peppered upper surface; the scapulars, wing-coverts, tertiaries and inner secondaries are similar, but the black lines are fewer in number, much coarser and stronger and less regular. This irregularity increases as we proceed outward on the flight feathers; on the outermost secondary the outer web shows three wide, almost longitudinal lines of black, which are continued around for some distance on the inner web, but part-way down the vein they disintegrate into an irregular mottling; the primaries show almost a reversed condition, the more complete lining being on the inner web, the outer showing only mottling.

The tail is very long, slender, tapering and graduated. Central feathers pure white; lateral ones show a gradual increase of irregular, oblique, black lines; these first appear basally, on the outer web, and increase in strength and extent, but decrease in number until on the outer pair we find only three pairs of broad black concentric lines; the long upper tail-coverts are similarly entirely covered with numerous, rather thin regular lines.

Chin, throat, fore-neck and entire ventral plumage black, glossed with purple; the transition from the upper to the under plumage on the sides of the breast is very abrupt, the bordering feathers usually having the more ventral web black and the upper web white.

Entire face and lores bare, the skin strongly papillated and brilliant blood-red; at the breeding season the three pairs of wattles, so typical of this genus, are strongly developed; irides red brown; bill usually greenish horn, but varied with darker; legs and feet scarlet. The spurs are stout, strong, slightly curved and very sharp, very efficient weapons.

Chinese Silver Kaleege vary enormously in their measurements. The birds I have from Fokien are the largest. Those from Yunnan show the greatest variation. I think that even in some specimens which in pigment and pattern are quite typical, hybridism is shown by the small size in general and the shortness of the tail, approaching *lineatus* in these respects.

A fully adult large-sized male which I obtained in central Fokien shows the following measurements: length, 1112 mm.; bill from nostril, 21; wing, 285; tail, 633; tarsus, 90; middle toe and claw, 70; spurs, 20 mm. I have measured several birds which equalled these measurements, two from Yunnan. The first, however, was a cock from north-west Fokien, which excelled by far any other Silver Kaleege I have ever examined. Its total length was no less than 1365 mm; bill from nostril, 23; wing, 290; tail, 860; tarsus, 101; middle toe and claw, 75; spurs, 20 mm. The tail, 860 mm. (over 34 inches), was a marvel of grace, curving upward in a low gradual arc.

VARIATION

We can hardly deal with variation without encroaching upon the domains of hybridism. However, in birds from the heart of the range, or from Fokien, we find that in only about fifty per cent. are the central tail-feathers wholly immaculate. Even the extreme specimen from north-west Fokien whose remarkable size I have noticed has very pronounced black spotting on the basal half of the outer web. I have already written of the variation in size, and in the strength of the black dorsal lining; there are hardly two individuals exactly alike. All, however, lie within such limits that there is no hesitation in distinguishing a pure-blooded bird from the mere hybrid forms. I have obtained birds of the typical *nycthemerus* plumage well within the ranges of the so-called *ripponi*, *rufipes* and *sharpei*. A number of skins have come to my attention, taken well within the range of the Silver Pheasant, in which the legs and feet, instead of being scarlet, were white or greenish, the birds otherwise being typically *nycthemerus*. A captive bird of this description has lived for many years in one of the London parks.

Adult Female.—The upper plumage a rich golden brown, peppered with darker. The head is brown, the crest feathers becoming blackish toward the tip. Tail variable, the outer rectrices blackish, with irregular broken lines of white or buffy-white, the four central rectrices ashy-brown with irregular dark brown bars and lines. Below ashy-brown, paler on the chin and throat, and on the lower breast, which shows more or less mottling and barring with brownish. These markings increase in strength and size posteriorly.

Bill dull greenish, paler at the tip; facial skin scarlet or dull crimson; irides red-brown; legs and feet clear coral red. Bill from nostril, 20 mm.; wing, 225; tail, 285; tarsus, 88; middle toe and claw, 70 mm.

Chick in Down.—Head pale orange buff or golden brown, darkening on crown, becoming narrower and darker brown on nape, and changing to a very wide area of blackish-brown on the back. This blackish or chocolate brown is split by two pale, buffy white lines down each side. Shoulders more reddish brown; a short, narrow black line extends back from the eye; beneath pale yellow buff, changing to white posteriorly; facial area well indicated by very short down. Bill greenish yellow; iris pale hazel; legs and feet red. The newly-hatched Silver is about a third larger than a golden chick.

Juvenile Plumage of Seven Weeks Bird.—Top of head from crown to nape brown, so broadly tipped with black that it appears of this colour. Facial area almost bare, sparsely covered with pale buff down; ear-coverts brown; upper parts sandy brown, finely vermiculated with black; wing-coverts and secondaries the same, but with narrow buff tips to the greater coverts. Scapulars and inner coverts with a blackish, subterminal band as well; black markings on outer secondaries very coarse; primaries barely edged with brown. Chin and throat white; breast sandy brown, with whitish centres to the feathers, giving a streaked appearance. This area increases posteriorly, so that the abdomen appears whitish, coarsely but indistinctly cross-barred with pale brown. The tail is the most striking part of the bird, and, except for its very small size, closely resembles the tail of the adult hen. There are eight pairs of rectrices, averaging a full third shorter than those of the hen. The outer six pairs are clearly patterned in black and white; a black background, with from six to twelve wide white cross-bars; a brownish border mottling appears on the third pair, which on the second almost eclipses the cross-barring; the central pair is cinnamon brown, obliquely vermiculated with black. The longest tail-feather measures 200 mm.; wing, 170; bill from nostril, 9.

First Year Male.—Similar to the female, but without the ventral markings, the lower surfaces being almost uniform buffy brown.

The sequence of moults varies greatly in individuals, but in American-reared birds the young males change into the plumage of the adult male, and thence, in April of the second year, begin to acquire adult male characters.

EARLY HISTORY

As long ago as 1740, Eleazer Albin gave a plate and a quaint description of the White China Pheasants, of which he says: "This bird I saw at a Lady's at Enfield where I made a drawing from it. I do not find this bird described in any author." Seven years later George Edwards enlarges on this, and gives a plate fairly accurate, at least in form, of the Black and White Chinese Pheasant. His comments are as follows: "These curious birds were kept many years by Sir Hans Sloans, at his house in London, where they hatched young ones and brought them to maturity." He criticizes Albin's figure, and says that in return for his corrections and additions he hopes "the curious will not think my labour lost——" It is probable that he only saw this bird in a yard walking, and took his sketch from it there, so he could not be so particular as I had the opportunity of being; these birds being the property of my good patron, whose house I frequented; and had opportunity often to repair my draughts by strictly examining them in their minute parts, not only while they were living, but after they were dead."

In 1766 Linnaeus gave it the specific name which it bears to-day.

SYNONYMY

White China Pheasant Albin, Nat. Hist. Birds, III. 1740, p. 35, pl. XXXVII.

Black and White Chinese Pheasant Edw. Nat. Hist. Birds, II. 1747, pl. 66.

Phasianus nycthemerus Linnaeus, Sys. Nat. I. 1766, p. 272; Gmelin, Sys. Nat. I. 1788, pt. II. p. 743; Latham Ind. Orn. II. 1790, p. 631; Bonnat. Tabl. Encycl. Méth. I. 1791, p. 187, pl. 89, figs. 1 and 2; Hays, Osterl. Menag 1794, p. 13, pls. 13 and 14; Timminck, Pig. et Gall. II. 1813, p. 281, III. 1815, p. 665; Vieillot, N. Dict. d'Hist. Nat., XI. 1817, p. 40; Steph. in Shaw's Gen. Zool. XI. 1819, p. 234; Griff. ed. Cuv. III. 1829, p. 23; Less. Traité d'Orn., 1831, p. 495; Schinz, Nat. Abbild. Vög., 1833, p. 248, pl. 95; Jard. Nat. Lib. Orn., IV. 1834, p. 207, pl. XVIII.; Schinz, Nat. Vög., 1853, p. 148, pl. 71.

Faisan noire et blanc de la Chine D'Aubent, Pl. Enl. pls., 123, 124; Buff. Hist. Nat. Ois., II. 1771, p. 359.

Pencilled Pheasant Latham, Gen. Syn., II. 1783, pt. II. p. 719; id. Gen. Hist. VIII. 1823, p. 199.

?Phasianus crawfurdii Gray, in Griff. ed. Cuv. III. 1829, p. 27 (♂ juv.).

Gennaeus nycthemerus Wagler, Isis, 1832, p. 1228; Grant, Cat. Birds British Museum, XXII. 1893, p. 307; Grant, Hand-book Game-birds, I. 1895, p. 277; Rickett and La Touche, Ibis, 1897, p. 602 [Kuatun, Fokien]; Oates, Game-birds India, I. 1898, p. 363; Sharpe, Hand-list Birds, I. 1899, p. 36; Rickett, Ibis, 1900, p. 59 [Ching Fung, Fokien]; Grant, Ibis, 1900, p. 606 [S. E. of Bhamo, S. Yunnan]; Oates, Cat. Birds Eggs British Museum, I. 1901, p. 55; Oates, Ibis, 1903, pp. 94, 97, 98, 99 [cf. with *jonesi*]; Ghigi, Arch. Zool., I. 1903, p. 325; Günther, Proc. Zool. Soc. London, 1904, p. 371 [hybrid]; Rothschild, Bull. Brit. Orn. Club, 1904, p. 58 [hybrids]; La Touche and Rickett, Ibis, 1905, p. 58 [Central and N.W. Fohkien]; Ghigi, Mem. Acc. Sci. Bologna, 1909, p. 264; Martens, Jour. für Orn. 1910, p. 449 [Fokien]; Finn, Game-birds India and Asia, 1911, p. 74; Ingram, Nov. Zool., XIX. 1912, p. 270; Finn, Avic. Mag. (3), III. p. 102 [variation]; Beebe, Zoologica, I. No. 17, 1914, p. 320; Bangs and Phillips, Bull. Mus. Comp. Zool. Harvard, LVIII. 1914, p. 269 (Mengtsze); Baker, Jour. Bombay Nat. Hist. Soc., XXIII. 1915, p. 679.

Euplocomus nycthemerus J. E. Gray, Ill. Ind. Zool., II. 1834, pl. 38, fig. 2; G. R. Gray, List of Birds, pt. III. Gall. 1844, p. 25; Blyth, Cat. Mus. As. Soc., 1849, p. 244; Gray, Hand-list Birds, II. 1870, p. 260; Hesse, Jour. für Orn., 1907, p. 217.

Nycthemerus argentatus Swains., Class Birds, II. 1837, p. 341.

Gallophasis crawfurdii Gray, Genera Birds, III. 1845, p. 498.

Gallophasis nycthemerus Gray, Genera Birds, III. 1845, p. 498.

Euplocamus nycthemerus Gould, Birds Asia, VII. 1859, pl. 17; Sclater, List of Phas., 1863, p. 8 [Southern China]; Swinhoe, Proc. Zool. Soc. London, 1863, p. 307; Gray, List Gallinae Brit. Mus., 1867, p. 33; Swinhoe, Proc. Zool. Soc. London, 1871, p. 399; Elliot, Mon. Phas., II. 1872, pl. 21; David and Oustalet, Ois. Chine, 1877, p. 416 [S. China, Fokien, Chi-kiang]; Gurney, Ibis, 1888, p. 230 (female assuming a male plumage). Evans, Ibis, 1891, p. 77 [length of incubation]; La Touche, Ibis, 1892, p. 494 [Yen-ping-fu hills, west of Foochow]; Rickett, Ibis, 1894, p. 225 [Yen-ping-fu]; Gurney, Ibis, 1899, p. 39 [longevity]; La Touche, Ibis, 1900, p. 49 [Kuatun, Fokien]; Tegetmeier, Pheasants, 1904, p. 222; Horne, Pheasant-keeping, p. 37.

Gennaeus argentatus Ghigi, Rend. R. Acc. Sci., 1908, p. 1 [Development of sexual characters].

Gennaeus nycthemerus nycthemerus Baker, Jour. Bombay Nat. Hist. Soc., XXV. 1917, p. 338.

HAINAN SILVER KALEEGE

Gennaeus whiteheadi Grant

NAMES.—Specific: *whiteheadi*, after John Whitehead, who lost his life in the expedition on which he discovered this species. English: Hainan or Whitehead's Silver Kaleege.

BRIEF DESCRIPTION.—Male: Most nearly allied to *nycthemerus*. Nape and upper mantle pure white; remainder of upper plumage with two or usually a single, arrow-shaped submarginal black band, increasing in width toward the tail; wing markings are strong black lines, few in number; central tail-feathers usually white or with a few isolated black lines; these increase in width and number toward the outer pairs, which are predominately black. Female: Resembles more closely the female of *lineatus* than that of *nycthemerus*. Crown and nape mottled brown; neck and mantle black with wide white shaft-streaks; under parts with the white dominant, the black reduced to a wide margin; lateral tail-feathers chestnut.

TYPES.—In British Museum of Natural History.

RANGE.—The Island of Hainan.

GENERAL ACCOUNT

IN the year 1899 John Whitehead, an English collector, visited Hainan, and discovered the present species of kaleege. Less than eight weeks after securing it he died of fever. The following extracts from his journal give us all that we know in regard to the haunts of this splendid bird—

"March 25th. Started for the mountains again to-day, arriving at 5 p.m. at a small village, where we camped for the night. Saw a few birds, a *henicurus* in the river, and a number of *pericrocoti*, also a few *Palæornis javanicus*. I see neither the white crow nor the magpie so far inland. Francolins are still abundant. We meet every day Chinese carrying bundles of skins of deer, monkeys, and pangolins, so I am sure we are not far from some large forests.

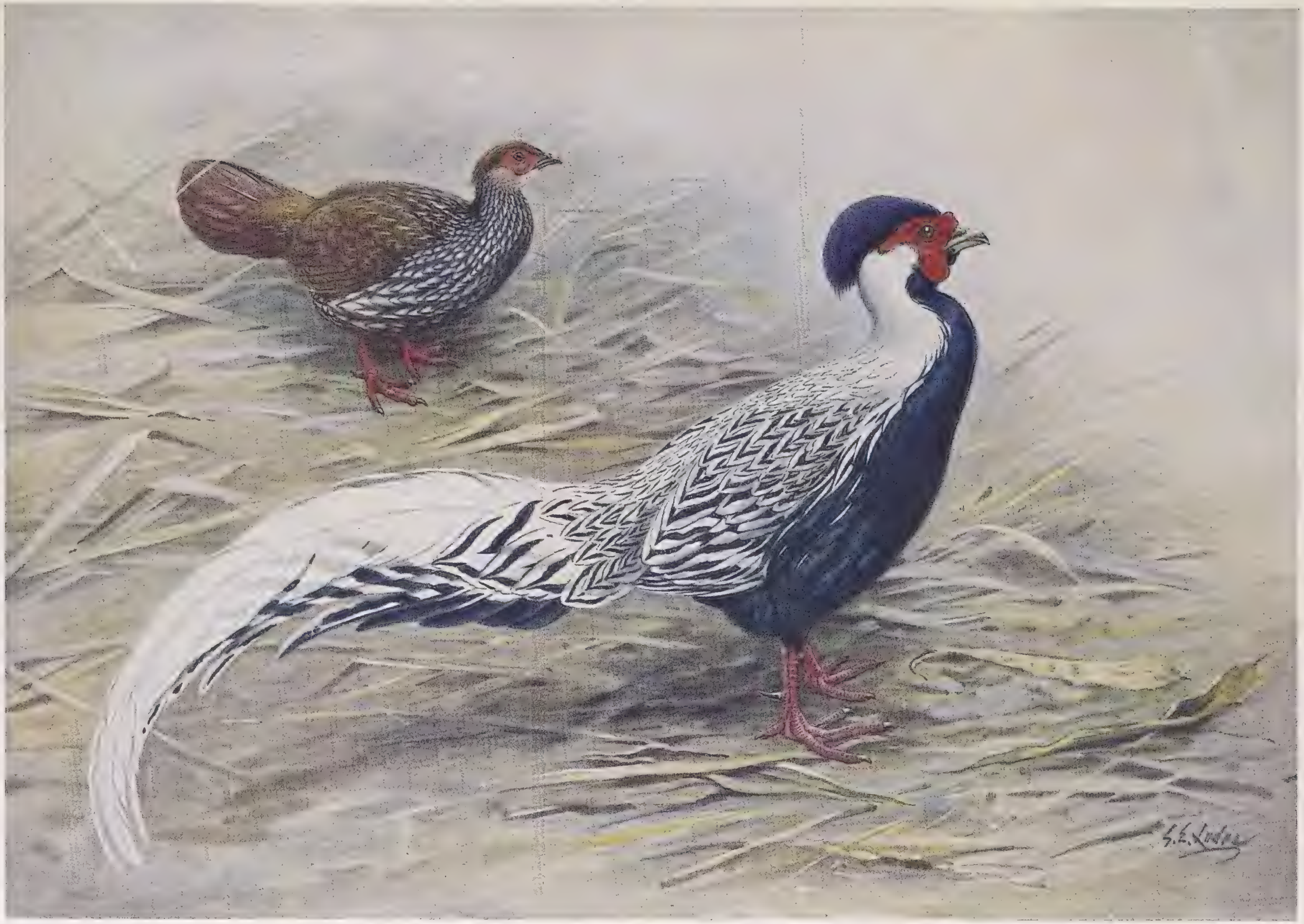
"26th. Our Chinese porters refuse to go any further to-day; they say they have no rice, but the truth is they are done up and want to rest. The Mandarin sent two soldiers with us, so that we should be looked after; they have proved most useful. Some Chinese wanted to prevent our going through their village yesterday: one of them was, I think, drunk, and nearly had a row with us. The country is slightly less barren, but still a miserable place for collecting in. Rain all night. The hills have been so enveloped in clouds that I have not yet been able to see the mountain-tops. I hope to reach our destination some time to-morrow.

"27th. Instead of reaching our destination to-day, the Chinese have taken us a day's journey away from the mountains, as they say there is no road this (the north) side, so we have had to tramp over bare hills in a broiling sun. My old trouble, dysentery, is a great worry to me. The Lois, or Lū, as the Chinese call them, are, so far as the men go, nearly like the Chinese. The hair is at times a pigtail tied in a knob, but more often a knob of hair tied in front, which looks like a unicorn's horn. Their villages are small, the houses of grass and sloped like an arch, and they live on the ground. The women

HAINAN SILVER KALEEGE

Gennaeus whiteheadi Grant

THIS bird is very close to the Silver Kaleege, but as it is found only on an island off the south China coast, it must be recognized as a distinct species. There is less white on the outer tail-feathers than in the silver bird, while the female is actually more like the corresponding sex in the Lineated than in the Silver Kaleege. Mr. Whitehead, who obtained the first specimens, died before he left the country, and since that time only Japanese collectors have taken the bird.



HAINAN SILVER KALEEGE.

are quite distinct from the Chinese, wearing very short skirts of blue, or with a red-and-white pattern.

"28th. Still on the march. Arrived at Lū village in the evening, but the men seemed so disagreeable that we went about half a mile away and camped. They then followed to see all they could, and were amazed at our guns. Bought half a pig for $1.50.

"29th. Left early, as I wanted to camp near the mountain. Sent Andres and Juan off at 4 a.m. to look for a spot. Nearly had a row with our Chinese porters, but formed up in their rear, so that they had to go on, after using a good deal of bad language at us. Have struck a nice place for a camp, close to a fine rocky stream not far from the mountains. Hear lots of birds. Am very seedy with dysentery, Juan with fever. Busy building a house all day.

"30th. Busy house-building. Caught some beautiful butterflies in the river. Saw a fine kingfisher, I think *Alcedo euryzona*, also some monkeys.

"31st. This being Good Friday we have resolved not to begin collecting to-day—unlucky—but to finish off the house. It rained this morning and was very cold before daylight. A cloudy day, saw no butterflies. Begin collecting to-morrow.

"April 1st. At last we were able to go shooting. Andres brought in four birds. Hills very steep, sand and rocks; this is the reason why they are left alone by the natives. Sand-flies awful. Butterflies numerous in the river-bed. Saw a large kingfisher and some squirrels.

"Natives visit us daily: fowls 10 cts., ducks 25 cts., eggs ½ ct.

"2nd. Very seedy with dysentery. Juan shot a silver pheasant which may be new, and a fine paradise flycatcher. Heat and sand-flies awful.

"3rd–19th. All ill with fever and dysentery.

"19th–30th. The bird collection is going along slowly—my men being all ill one day or another; one or two have been ill every day with fever. I am perhaps in better health than I have been for some time. Lū women catching caterpillars for food. It rains heavily and thunders every afternoon, and our life here, owing to fever, is most miserable.

"May 1st–6th. All my men ill with bad fever. The two Chinese and myself do not suffer much.

"7th. I saw a Lū with some rat-traps identical with those made by the Kina Balu Dusans. Changed into my new house. Very fine for the last few days, no rain. Men (Philipinos) hopelessly ill, and have done nothing for a fortnight. Sent the Chinese soldier out to shoot for me; want to see if he is worth anything.

"9th. Three of my Manila men left me to-day of their own accord. I trust they will reach Hoihow safely. It makes me very sad all this illness. I gave them the option of going, as I should be very sorry to be the cause of the death of any one of them.

"10th. To-day is very wet; the Manila men will have a sad time of it, I expect. My boy Juan is still with me, not because he cares about staying with me, but because he was too ill to start with the others. The Chinese soldier is doing my shooting and gets on very well.

"11th–16th. Am trying to work on with one boy, who is not much use at bird-skinning. The Lū are beginning to bring things, which is a good job, so perhaps I shall get on after all.

"20th. Attacked again by fever—very seedy—useless. John Afar also.

"21st–23rd. Nearly dead with fever—no food—no depression of temperature.

"24th May." (Diary ends.)

His Chinese servants carried Mr. Whitehead's body and all his luggage and collections back to Hoihow, a journey which occupied nineteen days, and there the British Consul forwarded the collections to the British Museum. Three males and a female were secured.

Since then a Japanese has sent a large series to Tring, where I was able to study them.

DETAILED DESCRIPTION

Adult Male.—Under parts wholly dead black, with a steel-blue gloss on the lateral plumage, and narrow white shaft-streaks on the extreme sides; forehead brownish black, merging into the metallic steel blue crown, and the long, flowing, hair-like occipital crest of the same colour; a few feathers just behind and concealed beneath the crest are black and white, but the ear-coverts and the entire back and sides of the neck, and much of the mantle, is snow white.

On the mantle a very faint brown mottling of two concentric lines appears on each web, increasing in blackness and solidness posteriorly; at first both pairs are equal, but on the mid-back the inner pair shows a tendency to close in on the shaft, and to reassume the mottled character; this pattern either remains to the rump or else the inner pair coalesces and forms a black shaft-line, leaving but a single concentric pair on the white webbing; the longer tail-coverts show a strong tendency to oblique cross-barring.

The wing markings stand out from the innermost least covert as very wide and strong black lines. These are not concentric, but in the shape of one or two oblique V-shaped cross-bars, the inner scapulars with as many as four, and the outer with six, while a few more are added to the primaries.

The central rectrices may be pure white, or may have five or six isolated black lines on the outer web, running parallel to the shaft and margin; the second pair is usually white as to the inner web, with numerous very coarse oblique bars on the outer; the succeeding lateral feathers show a greater and greater extent of black, until it occupies by far the major part of the outer web. A greater contrast to the lineated pheasant could hardly be well imagined.

Iris brownish-yellow; wattles and facial skin scarlet; bill greenish-white; legs coral-red. Length, 900 mm.; wing, 248; tail, 520; tarsus, 91; middle toe and claw, 61; spurs, 18 mm.

Adult Female.—Crown and nape brown, indistinctly mottled with darker and with a pale shaft-stripe; there is an abrupt change on the hind neck and mantle to black feathers with a wide, elliptical, tapering shaft-stripe; on the lower mantle this changes as abruptly again to a finely vermiculated rufous buff, the shaft-stripe persisting as a narrow, pale buff streak, dying out on the shorter tail-coverts; wing-coverts like the back and rump, but with the shaft-streaks paler and larger, dying out on the longest coverts and inner secondaries; secondaries show coarser mottling, and are very dark on the inner web, which in the primaries is plain brownish black. Central rectrices rufous, vermiculated with black. Lateral rectices chestnut, almost free from dark mottling.

Chin and throat white, changing abruptly to the mantle pattern, although the white is so predominant that I should invert the description of the pattern, and say that the ventral surface was white with very wide black margins; on the side neck this merges insensibly into the mantle; on the sides and under tail-coverts the black increases in width.

Iris light brown; upper mandible greenish brown, lower dull green; naked skin on face red; legs and feet bright scarlet. Length, 520 mm.; wing, 205; tail, 228; tarsus, 76; middle toe and claw, 53 mm.

First Year Plumage Male.—Is similar to the female, except that the crest of steel-blue is just making its appearance, and the black of the mantle and hind neck is replaced with olive; the body plumage as a whole is darker, and more rufous, while the central rectrices are chestnut, like the lateral ones, and faintly marked with numerous fine, wavy, oblique bars. The secondaries are similar to the central rectrices.

This, I think, unquestionably shows the derivation of the species from some more finely marked mainland form in the direction of *lineatus*.

The chin and throat are black, with broad tips and a shaft-streak of white, and the ventral surface shows a greater amount of black than do the females. Wing, 230 mm.; tail, 258; tarsus, 86; middle toe and claw, 60; spur, 8 mm.

SYNONYMY

Gennaeus whiteheadi Grant, Ibis, 1899, p. 586 (n. sp. Five-Finger Mountain in Hainan); Grant, Ibis, 1900, pp. 460, 461, 503, pl. XXXIV. (desc. and coloured plate); Ghigi, Arch. Zool. I. 1903, p. 327; Ghigi, Memoria R. Acc. Sci. Bologna, 1909, p. 264; Hartert, Novitates Zoologicae, XVII. 1910, p. 191 (Mt. Wuchi); Beebe, Zoologica, I. No. 17, 1914, p. 320; Baker, Jour. Bombay Nat. Hist. Soc. XXIII. 1915, p. 686.

EDWARD'S KALEEGE

Gennaeus edwardsi Oustalet

NAMES.—Specific: *edwardsi.* English: Edward's or Annam Kaleege.

BRIEF DESCRIPTION.—Male: Cap white; body metallic purplish black, with pronounced terminal fringe on rump and tail-coverts; wing-coverts shining green with disintegrated fringe; wings and tail black; facial skin, legs and feet scarlet. Female: Brownish-grey; paler on the neck, and becoming more rufous on scapulars and wing-coverts; tail blackish; face and legs scarlet.

TYPES.—In Paris Museum.

RANGE.—Province of Kuang-tri in Annam.

GENERAL ACCOUNT

ALTHOUGH this very distinct species has been known for nineteen years, absolutely nothing has been recorded in regard to its haunts or habits.

In the Museum d'histoire naturelle in Paris there are four specimens, three males and a female, the only ones of this species which have been thus far collected.

Oustalet, in his description of the species, as given in the "Bulletin Museum d'histoire naturelle" in 1896, adds: "This exceedingly remarkable species, which the Museum has acquired from P. Renauld, consisting of the skins of two adult males, a young male and a few odd bits of plumage, forms in certain respects a transition between *Gennaeus* with roof-shaped tail, and *Acomus* with a flattened tail." I am quite certain that the mounted bird which Oustalet considers a young male is a fully adult female. The details of coloration are rather those of a female than a male in first-year plumage. There are absolutely no signs of immaturity in the plumage, and this, in connection with the nodule-like spurs, would indicate that the bird, which was unsexed by the collector, is a full-grown female. I have described it as such. The final suggestion made by Oustalet is an error, since the tail of *Acomus* is as distinctly roof-shaped or laterally compressed as that of *Gennaeus.* The relation with *swinhoii* which I have mentioned elsewhere is very apparent, as in the crest, tail, specialization of feather structure, and other characters.

DETAILED DESCRIPTION

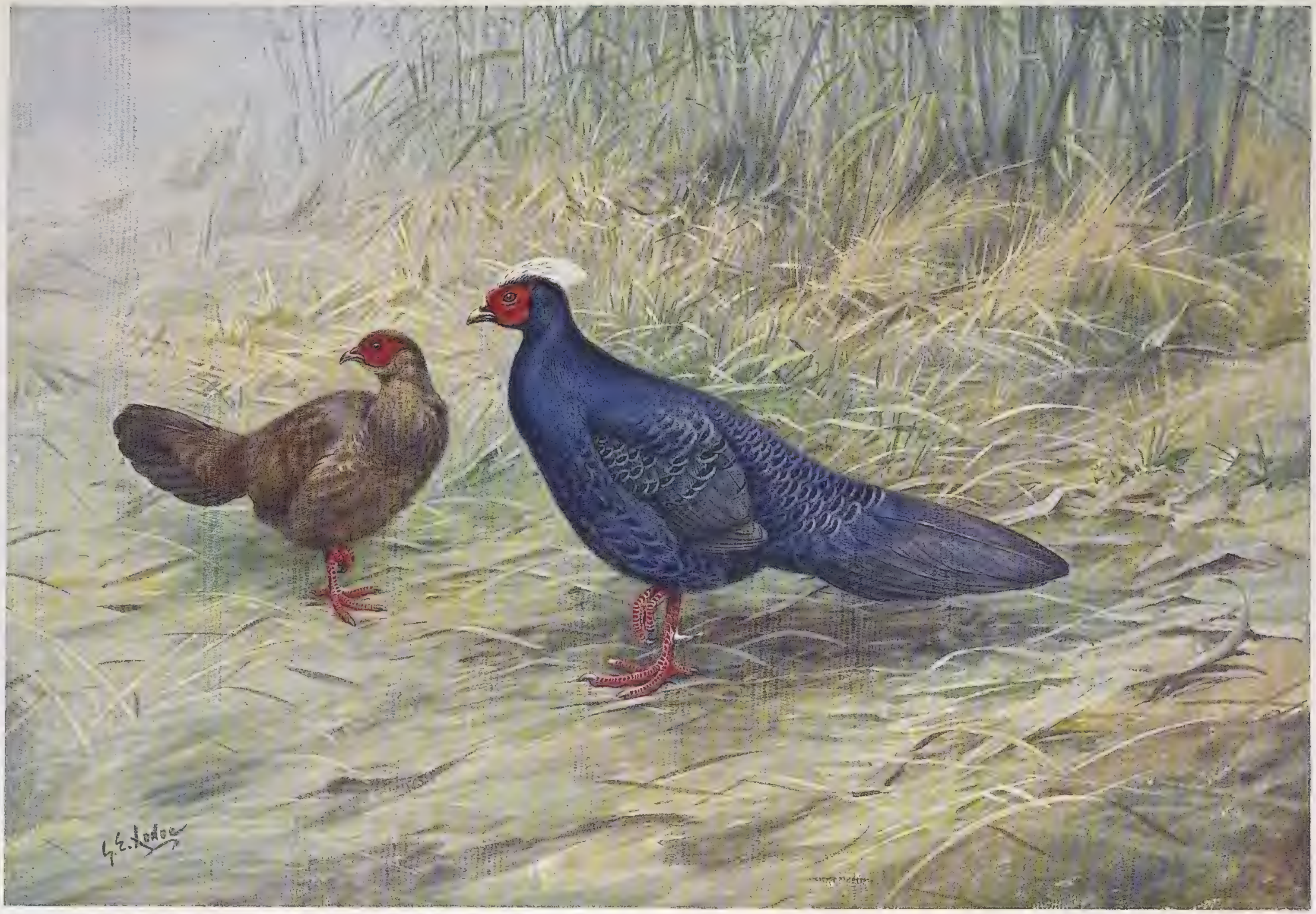
ADULT MALE.—Facial skin corrugated and scarlet; forehead, narrow superciliary (above facial skin), posterior crown, chin, upper neck and ear-coverts brownish-black; stiffened crown feathers moderately elongated into a crest, white, tipped with black; the sharp transition into the short, black, posterior crown is by a few lines of short feathers, white crossed by several black bars; the black feathers merge at once into the typical body plumage; this is shining purplish blue, the former tint predominating on the neck, breast, sides and mantle, and changing almost insensibly into a

EDWARD'S KALEEGE

Gennaeus edwardsi Oustalet

Although known for a quarter of a century, absolutely nothing has been recorded of the habits of this very distinct and beautiful pheasant. Four specimens have been obtained from the province of Kaung-tri in Annam.

PLATE XXIX.



EDWARD'S KALEEGE.

purer metallic blue posteriorly. The most striking difference lies in the fringe. While a broad, disintegrated fringe exists on the mantle, it is hardly apparent, but on the lower back, rump and tail-coverts the fringe becomes convex, reflecting the light from a different angle. So although the entire feather is actually shining blue, a side view shows the convex portion of the tip as deep velvety black, in contrast to the remaining basal and extreme terminal parts. The tail-feathers have a faint bluish lustre on the outer webs, but on the whole appear dull black in contrast to the rump and tail-coverts.

The wings are rendered distinct by all the coverts being green, with convex fringe, as on the rump. The post-fringeal part is rather less metallic in colour. The illusion of a black centre to the shining green fringe is most persistent, and only when the wing is looked at in perspective, held away from the light, does the green sheen creep over the entire fringe. In this position the post-fringeal part becomes black. The black-centred, green tips of the coverts, arranged in row after row across the median part of the wing, are very conspicuous. The inner secondaries are tinged with a greenish-blue lustre, but the remainder are brownish-black, while the primaries are lighter brown. The belly, thighs, vent and under tail-coverts are dull brownish-black.

Length (Oustalet), 580 mm.; bill from nostril, 16; wing, 220; tail, 240; tarsus, 76; middle toe and claw, 51; spur, 15 mm.

ADULT FEMALE.—The plumage is very sombre, consisting of various shades of brown, with almost no striking or distinguishing character. The crown is rather dark, paling into an ashy grey on the neck. The entire under parts are unmarked greyish-brown, while the upper plumage is warmer. A mottled fringe is found on the feathers of the back, which on the wing-coverts, secondaries, rump and tail-coverts becomes a fine, dark, inconspicuous vermiculation, evenly distributed over the entire feather. The wing-feathers and scapulars are more rufous than the rump, which tends slightly toward pale buffy.

The central two or three pairs of tail-feathers are tinged on the outer web with an inconspicuous dark purplish-brown, the remainder of the tail being brownish-black as in the male.

Bill from nostril, 15 mm.; wing, 200; tail, 193 (feather tips missing); tarsus, 68; middle toe and claw, 46. Spur, a sharp flattened nodule.

SYNONYMY

Gennaeus edwardsi Oustalet, Bull. Mus. Paris, 1896, p. 316 (n. sp. Kuang-tri, Annam); Oustalet, Arch. Mus. Paris (4), I. 1899, pl. 10 (figure); Ghigi, Arch. Zool. Ital., I. 1903, p. 325 (Relation to *swinhoei*); Ghigi, Mem. Acc. Sci. Bologna (6), VI. 1909, p. 260 (in genus *Hierophasis*, with *swinhoii;* Beebe, Zoologica, I. No. 17, 1914, p. 320; Baker, Jour. Bombay Nat. Hist. Soc., XXIII. 1915, p. 657.

SWINHOE'S KALEEGE

Gennaeus swinhoii (Gould)

NAMES.—Specific: *swinhoii*, after Robert Swinhoe, the discoverer of the species. He was for many years the British Consul in Formosa. English: Swinhoe's or Formosan Kaleege. French: Faisan de Swinhoe. German: Formosa-Fasan. Vernacular: Wá-koë (Chinese, adult male); Aw-kak or Awbay-kak (immature black-tailed male).

BRIEF DESCRIPTION.—Male: Facial skin scarlet; head, chin and throat black; crest, mantle and central tail-feathers white; scapulars dark metallic crimson; most of the wing-coverts with metallic green fringe; remainder of plumage glossed with purplish blue. Female: Crest short, black, tipped with reddish-brown; upper plumage and wings black, thickly mottled with reddish-brown; mantle, back and wing-coverts with a conspicuous arrow-shaped buffy mark; flight-feathers black, banded with rufous and whitish-buff; ventral plumage rufous-buff, obliquely barred with black; central tail-feathers irregularly barred and mottled with black and white; other rectrices dark chestnut.

RANGE.—The mountain forests of Formosa.

GENERAL DISTRIBUTION

WE have no definite information as to the distribution of Swinhoe's Kaleege, except that it is not found near the coast of Formosa, but only in the wooded mountains of the interior, and from the few certain records appears to occur from five to seven thousand feet, being most abundant in the central, and rare in the northern portions of the island.

GENERAL ACCOUNT

My account of the haunts and habits of Swinhoe's Kaleege is second-hand, as I had no opportunity of visiting Formosa and studying the bird in its native home. For many years Mr. Robert Swinhoe was the British Consul in Formosa, and it was due to his efforts that the first specimens of this pheasant were made known to science. In regard to this species, which was described in 1862 by Gould, and named after the discoverer, Mr. Swinhoe from time to time sent the following notes—

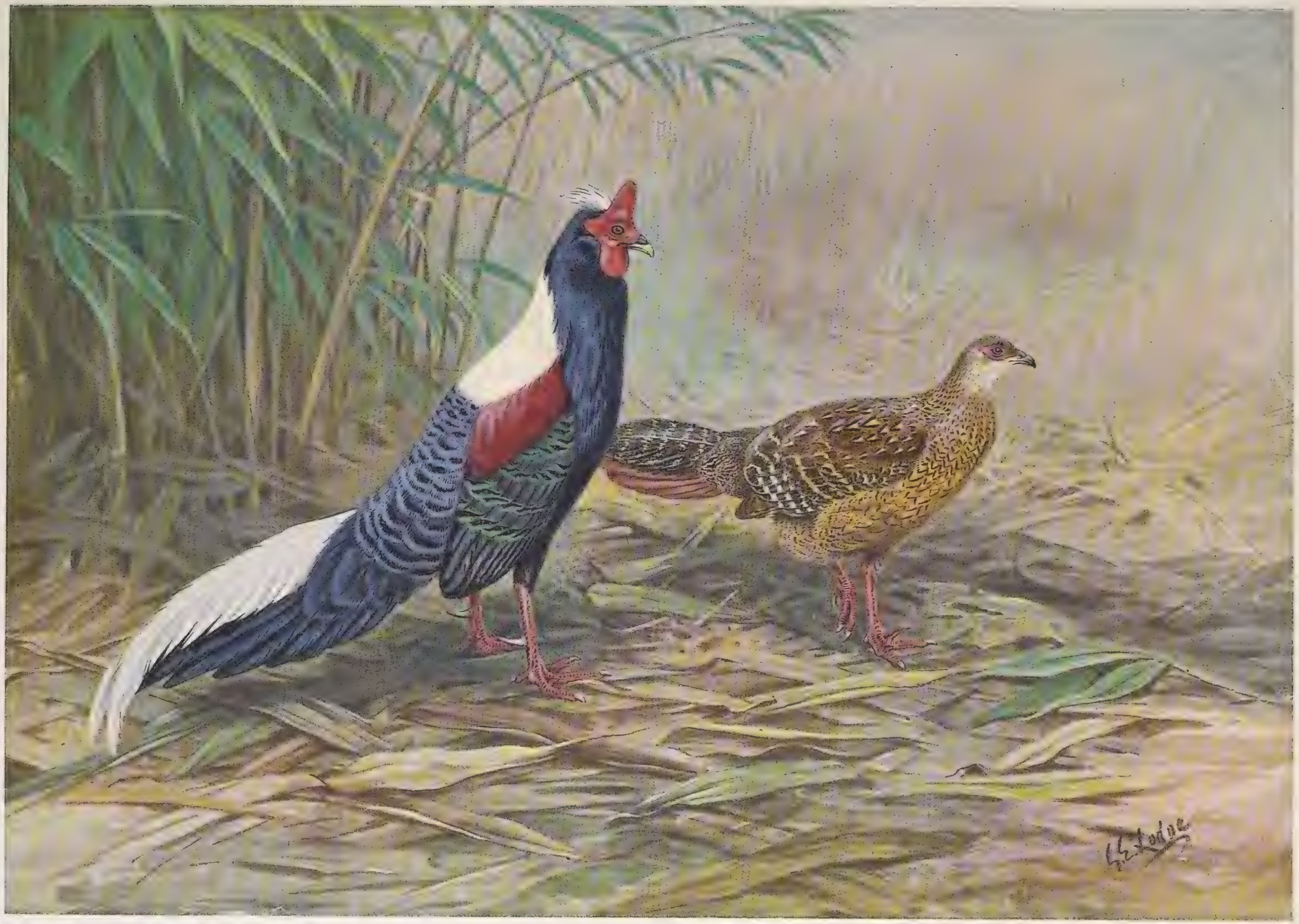
"I was informed by my hunters that a second species of pheasant, which was denominated by the Chinese colonists Wá-koë, was found in the interior mountains, that it was a true jungle bird, frequenting the wild hill-ranges of the aborigines, and rarely descending to the lower hills that border on the Chinese territory, and that in the evening and early morning the male was in the habit of showing himself on an exposed branch or roof of a savage's hut, uttering his crowing, defiant note, while he strutted and threw up his tail like a rooster. I offered rewards and encouraged my men to do their utmost to procure me specimens of this bird, and I was so far successful that I managed to obtain a pair; but in my trip to the interior it was in vain that I sought to get a view of it in its native haunts, and to make acquaintance with it in a state of nature.

"The female was brought to me on the 1st of April, soon after it was shot,

SWINHOE'S KALEEGE

Gennaeus swinhoii (Gould)

In the deep inland forests of the mountains of Formosa this splendid bird makes its home. None but the natives have observed or captured it, and there is no record of the nest and eggs being found, but the bird lays readily in captivity and is not rare in zoological gardens.



SWINHOE'S KALEEGE.

the heat of the weather compelling the hunters to skin it before they could reach me. It was, however, quite fresh enough to enable me to note the tints of its soft parts. The fresh skin of the male arrived on the 11th of April. My hunters had taken this bird alive, but it battered itself so that they were obliged to kill it to save its feathers.

". . . On the 8th of December I procured a fine male of *Euplocomus swinhoii* in beautiful plumage. It was brought to me from a distant station in the interior of this island, and I forwarded it to Hong-Kong, whence it was shipped to Dr. Squire, at Calcutta, for the London Gardens. I trust it may arrive all safe. This bird is rare, and extremely difficult to procure, as the mountain travelling here is far from safe. My chief bird-hunter was nearly murdered and robbed of fifty pounds, the other day, while in search of deer and this pheasant.

"I have seen many males with a plumage intermediate to that of the adult and their own sex and that of the females. This plumage is carried through the winter; but it varies in its resemblance to the one sex or the other. I thought at first that such birds were melanite varieties, especially as the Chinese distinguished them by a distinct name, *Aw-bay-kak* (black-tailed male); but I consider now that they are only young males in the transition plumage, which they carry till the next vernal moult.

"I have been so unsuccessful in getting live examples of *Euplocamus swinhoii* home, that I have had an aviary built here, and stocked it chiefly with birds of this species. I intend to keep them for some time, to get them into thorough condition, and then try further shipments. Those I have, though several months in confinement, are still shy birds, and skulk in holes the greater part of the day. They frequently utter a plaintive note 'co-co-co-*coo*,' the last a low wail, almost impossible to syllable. One fine skin of a hen I have got has a snow-white patch on the crown, and a few white feathers on the side of the jaws. In other respects it is normal."

While nothing has been recorded of the nesting habits of the wild bird, its eggs are well known, captive hens occasionally laying, but seldom rearing their young. Swinhoe reports that a hen in his possession laid an egg every two or three days, the first being deposited on March 17th.

The eggs of Swinhoe's Kaleege are regular ovals, smooth, rather glossy and unmarked. The shell varies from pale reddish-buff to creamy-white. They measure from 48 to 55 mm. in length, and from 37 to 39 in breadth; averaging 51 by 38 mm. Swinhoe gives 61 by 48 as the measurements of an egg, and adds that it is buffy-cream, very minutely dotted with white.

CAPTIVITY

Saint-Hilaire has given us some interesting records of Swinhoe's Kaleege in the Jardin d'Acclimatation in Paris. The first specimens were received in 1866. The following year twelve young birds were hatched, and in 1868 seventeen. In 1869 the birds began to lay March 15th and ended June 25th. From four adult hens sixty-nine eggs were obtained, from which fifty young birds were hatched, but on October 15th only fifteen, eight males and seven females, remained alive.

The price for the first pair of Swinhoes was between four and five thousand francs (about $900). In 1868 the price per bird had fallen to three hundred and fifty francs ($70), and the following year it averaged two hundred and fifty francs ($50).

Of thirty-two Swinhoe's Kaleege which have lived in the London Zoo the average length of life was one year, although one bird reached the age of five and a half years.

As we have seen, Swinhoe's Kaleege does not attain its fully adult plumage until the second year, but the birds will breed the first year while still in immature dress. Thus, of forty-one eggs from three young hens, twenty-nine, or about seventy per cent., were fertile. This, however, is exceptional, and the males seem to be much more inclined to breed the first year. As with golden and silver pheasants, this precocious breeding seems to increase with successive generations in captivity. Whereas wild trapped birds of the first generation will produce but few fertile eggs in their first year, succeeding generations prove much more willing and successful in this respect.

VARIATIONS.—An interesting variety, or perhaps true mutation, comparable with the black-shouldered peafowl and the black-throated golden has been described by Ghigi. This was one of four Swinhoe's Kaleege hatched from a brood of seven eggs, the parents being normal in every way. The bird in question was yellowish white.

DETAILED DESCRIPTION

ADULT MALE.—Posterior crown and nape with a flowing white crest. Back of neck and entire mantle down to the mid-back white. Remainder of head and entire under parts black, with a strong purplish sheen on all exposed portions of feathers, becoming dull brownish black on posterior abdomen. Scapulars deep crimson, forming very conspicuous patches on each side of the white mantle. Wing-coverts, lower back, rump and tail-coverts black, all with a specialized terminal band. In the wing-coverts this is metallic green, while in all the other feathers it is a brilliant, deep purple. The tail feathers are black, with the central pair and outer part of the second pair white.

Facial skin scarlet, covered with roughened papillæ and a scattering of small feathers ; legs and feet deep red ; irides bill yellowish horn.

Length, 790 mm. ; bill from nostril, 22 ; wing, 250 ; tail, 410 ; tarsus, 93 ; middle toe and claw, 70 ; spur, 35 mm.

The specialized terminal fringe on the wing-coverts, lower back and tail-coverts corresponds in *gennaeus edwardsi*, and is characterized by three abrupt changes in the vane, first, the total loss of all barbicels, second, a pronounced flattening of the barbules, and an alteration in the angle of attachment of these barbules to the barbs—the two rows being raised, so that, instead of lying on opposite sides in a flat plane, they form an obtuse angle with each other.

ADULT FEMALE.—There is a short inconspicuous crest, which, with the remainder of the head and neck, is greyish brown, mottled indistinctly with black ; mantle, scapulars and wing-coverts buffy-brown, with large, arrow-shaped centres of rufous buff, margined with black. Lower back, rump and upper tail-coverts black, finely vermiculated with buff, becoming greyer posteriorly. Primaries dark brown, secondaries black, the former barred with rufous, the latter with buff. Chin and throat greyish brown. On the upper breast a buffy shaft stripe appears, which widens posteriorly until the dominant colour of the lower breast and abdomen is rufous buff, with irregular, black, V-shaped markings. The colour of the ventral plumage is variable, some birds being much redder than those of equal age and purity of blood. Central tail-feathers, like the upper coverts, with indistinct black bars strongly marked with pale grey. Outer rectrices dark chestnut, mottled irregularly on the inner webs with black.

Facial skin, legs and feet dull scarlet; irides brown; bill yellowish brown.

Length, 505 mm.; bill from nostril, 18; wing, 240; tail, 200; tarsus, 80; middle toe and claw, 50; spurs, a low sharp nodule.

First Year Male.—In the post-juvenile plumage the crest is only partly white, being thickly barred with black. The white in the mantle is apparent only as a wider or narrower shaft-stripe, the remainder of the feathers being chestnut and black. The metallic tips of the wing and back plumage are often lacking, or present only in the tail-coverts, while these feathers in general and the central rectrices are chestnut, more or less mottled with black. There is no blue sheen on the ventral plumage. No two males are alike at this stage, and in a bird whose moult has been delayed by cold weather I have seen every adult character well developed, and only to be distinguished from full-plumaged males by the impurity of the whites and a slight excess of chestnut.

Chick in Down.—Top of head from forehead to nape orange rufous, with a dark central crown line; facial area over and around eye whitish buff, with a black line obliquely downward and backward from the lower posterior rim of orbit over the ear-coverts to the lower nape; upper body, including sides and wings, dark chocolate; two creamy white lines begin faintly on the mantle and suddenly become broad and distinct on the lateral upper back, where they are strengthened into a spot by an adjoining patch on the inner wing edge. Posteriorly there is a short break, and then the typically pheasant-chick character follows, of two broad lines down each side of the lower back; these widen interiorly at the end just above the tail, but do not join. The tail down is rufous, as is also an indistinct line connecting the thighs with the tail; lower side, neck, outer thighs and breast also rufous, the latter being less pure in colour; chin, throat, and abdomen pure creamy white; across the down of the middle coverts is a very broad bar of buffy white.

Bill from nostril, 3 mm.; wing, 33; tail (down); tarsus, 22; middle toe and claw, 22 mm.

Twelve Day Chick.—Head and neck as before; wings have increased in length, and the tail, though short, has appeared; scapulars show as two lines of new feathers down the back, while the ventral surface shows two corresponding lateral lines extending from the lower neck to the thighs, all else being down.

The 9th and 10th primaries are only a short way out of the sheaths, while the others show a very equal growth. Measurements of the 10th and 8th measure respectively 12 and 63 mm. The appearance of the wing with the few first feathers is much simpler than that of two weeks later. The primaries are dark brown, with pale buff mottlings on the outer webs. This mottling is more extensive on the secondaries, showing a tendency to form a dark line along the outer margin. The greater coverts (which are all that have appeared) show a wide pale buff tip, with two lateral, subterminal, round spots of black.

Bill from nostril, 6 mm.; wing, 96; tail, 33; tarsus, 28; middle toe and claw, 28 mm.

Five Weeks Old Chick.—A chick of this age is clothed in juvenile plumage except for the chin, throat and facial area, which are still in down. Culmen, 7 mm.; wing, 119; tail, 76; tarsus, 35; middle toe and claw, 33 mm.

Eight Weeks Old Bird—In full juvenile plumage. Facial area showing only a few scattered down featherlets; entire upper head and neck and the sides of latter dark seal brown, paling gradually toward the throat into white on the chin; feathers of chin and throat, sides of lower face and neck recurved, standing up separately. General tone of upper parts very dark brown, finely mottled with paler buff. The mantle and scapulars marked with an expanded, subterminal, elongated shaft-spot of clear buff. The back, rump and central pair of tail feathers show only the fine vermiculations, these being grey rather than buff. The buff shaft-spot is present on all the lesser and median coverts, becoming the terminal band of the greater coverts, but all the wing-coverts are sharply marked off from the feathers of the adjacent portions of the body by the two subterminal black spots. Toward the greater coverts these spots join and form a solid, conspicuous band of black just posterior to the terminal buff. This gives a handsome barred appearance, several lines of the successive buff and black. On the innermost secondaries the buff bar disappears, while the black pushes forward and forms a long, narrow margin. The primary coverts, like their flights, show no definite characters, being irregularly mottled with rufous and buff.

The 8th, 9th and 10th primaries are still growing strongly, showing that there is considerable delay in the growth of the first as well as the two outer ones. Numbers 4, 5, 6 and 7 are full-grown juvenile primaries. Number 1 is new, measuring 94 mm. out of the sheath, No. 2 is a bare 13 out of its sheath, while No. 3 has apparently just fallen out.

The juvenile primaries are curved, narrow and chiefly dull brown with little mottling. The new feather is broad, very dark, and with rufous marking on both webs, roughly longitudinal on the outer web and irregularly transverse on the inner.

There are six pairs of rectrices. The outer five pairs are much alike, rich rufous, mottled irregularly with black, while the central pair is cold, dark brown with greyish mottlings. There are faint indications of six or more pale lateral bars. The two central pairs are still growing strongly. All are juvenile. The outermost (full-grown) feather measures 81 mm.; the central (growing) ones 126 mm.

The under parts show a warm orange hue, beginning as a shaft-stripe below the grey of the lower throat, which rapidly enlarges on the breast and belly, where the black lateral marking is reduced considerably. The orange pales on the thighs and rear under parts.

Bill from nostril, 10 mm.; wing, 147; tail, 127; tarsus, 50; middle toe and claw, 43 mm.

SYNONYMY

Euplocamus swinhoii Gould, Proc. Zool. Soc. London, 1862, p. 284 [Formosa]; Sclater, List of Phasianidæ, 1863, p. 7; Swinhoe, Ibis, 1863, p. 401 [Formosa, notes of discovery]; Gould, Birds of Asia, VII. 1864, pl. 16; Swinhoe, Ibis, 1865, pp. 353, 538 [Plumage and notes]; Swinhoe, Ibis, 1866, pp. 133, 308, 404 [Notes on plumage]; Swinhoe, Ibis, 1867, pp. 232, 409 [Notes in captivity]; Sclater and Wolf, Zoological Sketches, 2, 1867, pl. 37; Gray, List Gallinæ British Museum, 1867, p. 34; Touchard, Bull. Soc. Acclim., 1870, p. 417; Swinhoe, Proc. Zool. Soc. London, 1871, p. 399; Elliot, Monograph Phasianidæ, II. 1872, pl. 25 [subgenus *Hierophasis*]; David and Oustalet, Oiseaux de Chine, 1877, p. 417, pl. 102; La Touche, Ibis, 1895, pp. 329, 338 [Bangkimtsing, South Cape]; La Touche, Ibis, 1898, p. 373 [Central Formosa]; Tegetmeier, Pheasants, 4th ed., 1904, p. 227; Mitchell, Proc. Zool. Soc. London, 1911, p. 522 [inability].

Euplocomus swinhoë Saint Hilaire, Bull. Soc. d'Acclim. (2), VII, 1870, p. 131 [Breeding in Jardin D'Acclim.].

Euplocomus swinhoei Horne, Pheasant-keeping, p. 42 [frontispiece].

Faisan swinhoe Touchard, Bull. Soc. d'Acclim. (2), VIII. 1870, p. 417.

Euplocomus swinhaei Mairet, Bull. Soc. d'Acclim. (2), VII. 1870, p. 348.

Euplocomus swinhoii Gray, Hand-list of Birds, II. 1870, p. 260.

Gennaeus swinhoii Grant, Cat. Birds Brit. Mus., XXII. 1893, p. 309; Grant, Hand-book Game-birds, I. 1895, p. 278; Nehrkorn, Kat. der Eiersammlung, 1899, p. 193; Ghigi, Arch. Zool., I. 1903, p. 324 [plumages]; Grant and La Touche, Ibis, 1907, p. 276 [Racu Racu Mts. 7000 feet; Ho Ho Mts. 5000 feet]; Ghigi, R. Acc. Sci. Inst. Bologna, 1908, pp. 1–14 [Mutatian in captivity]; Ghigi, Memoria, Sci. Inst. Bologna, 1909, p. 260 [genus *Hierophasis*]; Ghigi, Monitore, Zool. Ital., XX. 1909, p. 95; Finn, Game-birds of India and Asia, 1911, p. 79; Beebe, Zoologica, I. No. 17, 1914, p. 320; Baker, Jour. Bombay Nat. Hist. Soc. XXIII. 1915, p. 687.

Gennaeus swinhoei Sharpe, Hand-list of Birds, I. 1899, p. 36; Oates, Cat. Eggs Brit. Mus. I. 1901, p. 56; Rothschild, Bull. Brit. Orn. Club, XIV. 1904, p. 58 [Hybrids with *G. nycthemerus*, *L. diardi* and *L. ignita*].

(*G*) *Hierophasis swinhoei* Ghigi, Riv. ital. Orn., I. 1912, p. 272.

WILD KALEEGE HYBRIDS

KALEEGE HYBRIDS IN THEIR WILD HOME

STANDING on the high divide which shunts its eastern waters into China, and its western into the great rivers of Burma, one sees, in the direction of the latter country, a great tumbled, irregular mass of mountains and valleys. All is forest, clad with bamboo, oak and other hard woods, and it was here, hidden beneath that vast extent of many-tinted foliage, that I found pheasants which, from the point of view of their origin, were the most remarkable of their family.

Elephants and mules were the commonest means of transport, and I found it necessary to take an escort of six Gurkhas. The Kachin tribes hereabouts are nominally safe, but the individual components of these tribes are uncertain quantities. As still-hunting was my method of finding and observing these pheasants, and as I always carried a ·303 rifle cartridge in the third barrel of my gun, I worried little about human enemies and only twice was even threatened with any molestation. A few miles to the north, however, the wild tribes are wholly independent, and work their pleasure upon strangers.

We spent many delightful days in the study of these birds, glorying in the wonderful scenery and magnificent climate, after many months of hot, steaming, tropical jungles. The early November mornings were keen and clear, and every valley and depression was always filled to overflowing with a calm, waveless lake of cloud, while the farthest Yunnan peaks were of a deeper purple than ever painter dared put to canvas. The sweetness of the chorus of bulbuls was the major theme at this hour, with a minor accompaniment of distant cooing doves.

But pheasants were difficult to find in the morning, and one might wander about for hours with never a glimpse of them.

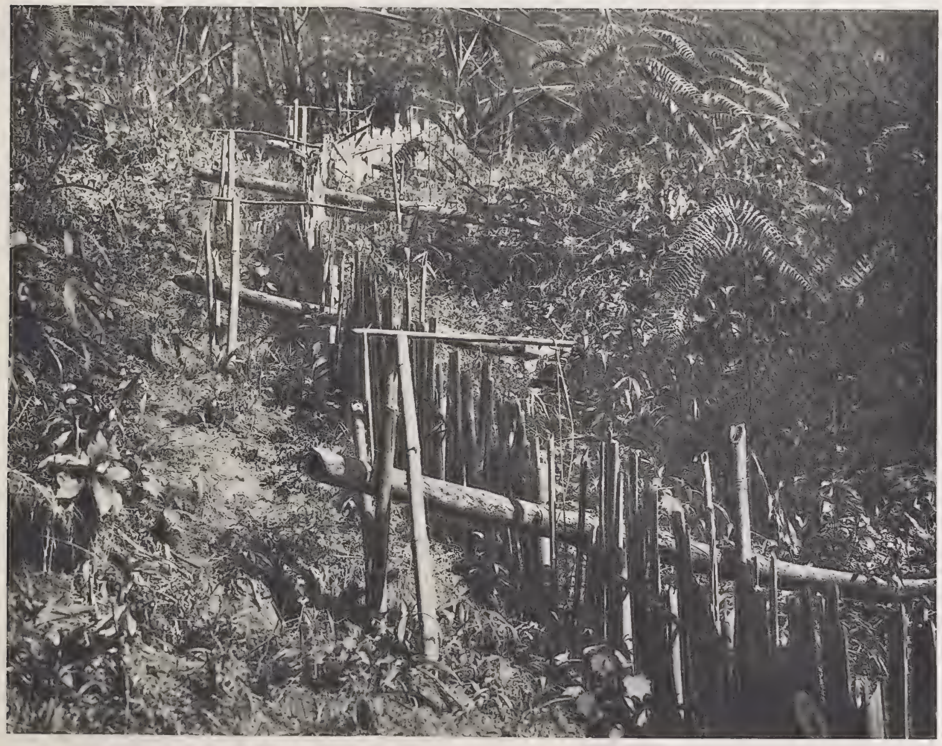
About three o'clock in the afternoon of one of my first days in this region, when the sun still held back the sting of the coming night air, I left camp and turned down one of the old native trails. The ground was littered with dried leaves, and the wind soughing through the bamboos gave an added hint of autumn even in this southern latitude. The rains were just over and the foliage was bright and clean. I crept as quietly as possible down to the very bottom of a deep ravine which the sun's rays had already left. I knew that the pheasants were certain, sooner or later, to come down to this level for their evening drink. Near the low murmur of the rivulet I seated myself and began my vigil. For an hour I sat thus, making certain that the birds had not yet come down. Through the curtain of lofty ginger stalks overhead I could see drongos darting here and there after insects. Small flycatchers and babblers passed in flocks, drinking and flitting upward again.

NORTHERN BURMA—YUNNAN BORDER—HOME OF THE HYBRID KALEEGE

Standing on the high divide which shunts its eastern waters into China and its western into the great rivers of Burma, a great, tumbled, irregular mass of mountains and valleys is seen. All are forest, clad with bamboo, oaks and hard wood, and here, hidden beneath that vast extent of many-tinted foliage, I found the northern Kaleege pheasants.

LINE OF KACHIN PHEASANT TRAPS

The Kachins and other native tribes use a deadly method of trapping. A low fence of split bamboo runs uphill and down for a mile or more, with deadfalls every few feet. When this is in full operation, few pheasants fail, sooner or later, to be caught, and whole districts are thus cleared of these splendid birds.



NORTHERN BURMA-YUNNAN BORDER:— HOME OF THE HYBRID KALEEGE.
LINE OF KACHIN PHEASANT TRAPS.

Mosquitoes rose in clouds and pestered me sorely. Once the low tree-ferns on the opposite bank were shaken, and through the deeper shade of their fronds I saw a small tiger-cat passing, slowly, sinuously. He, too, sensed that pheasants come here to drink.

Knowing from the silence that they were not yet among the bamboos above, I crept on up the valley. Tree-vines had hung their great masses of bloom overhead, and graceful wisteria-shaped flowers lightened the gloom with their pink and salmon petals, and spread far their musky odour—that of hemiptera. Some four-footed creature dashed from my path and, marking its fright, left another sharp stratum of musk upon the air.

I came upon a maze of footprints, where pheasants had that morning crossed the muddy rim of the pools, and here I turned upward. I know of no more difficult feat than attempting to climb noiselessly up a steep bank through clumps of bamboo, the ground covered with the driest of sheaths and leaves. Finally I passed the grave of a Kachin chief, covered by an oval, thatched hut and a curious ornament of dyed bamboo. Just beyond I reached the mule trail, which at this point cut into the bank of the upper slope. Still hearing nothing, I climbed half-way to the summit of the ridge, here an open growth of oaks, when suddenly a shift in the breeze brought to my ears a loud scratching and rustling among the fallen leaves beyond the summit. I was exposed to full view, so with all possible speed I backed down the slope on hands and knees, crossed the trail and ensconced myself in a small thicket, which gave me full view of the oak slope which I had just left.

For half an hour I heard nothing, then a leaf flew upward from a tangle of vines, and a sturdy form leaped high over a log into view. It was not a pheasant, but a big, black-gorgeted laughing thrush. Another and another hopped down the slope, now hidden by tree-trunks or bushes, now standing out in full silhouette. There were sixteen in all, spread out in a segment of a circle, and chuckling low to themselves at every succulent morsel. They are splendid, sturdy birds, jay-like from beak to claw, now holding a wormy acorn and pounding away as hard as a woodpecker, then, ant-thrush like, picking up leaves and throwing them far over their backs. I was absorbed in watching their gradual approach when a jungle-fowl crowed loudly in the valley beyond the ridge, and brought my mind sharply back to pheasants. I was keenly disappointed at having apparently missed my birds, and half rose to go. At my first motion a laughing thrush set up a truly jay-like yell, and answers came from a score of throats, guffaws and peals of loud laughter which no real jay could ever produce. I sat quiet, their alarm passed, and they began to sail overhead down the valley. Not being certain at this time of the species I fired and secured one.

I waited five minutes and heard not a sound, save the calls of the laughing thrushes far down below me. Rising stiffly, and slowly moving out into the trail, I began to reload, when half-way up the slope a black head and neck shot up, and the warning or suspicion cry of a kaleege pheasant rang out sharp and shrill.

I dropped flat upon the trail, and wriggled back over the edge into my thicket again. Not a cluck or call came from the slope above, but little by little a low sub-sound of rustling leaves, and in ten minutes the ground over which the laughing thrushes had passed was being quartered by eleven splendid pheasants. With balanced glasses I could see every feather. Four were adult cocks, four more were hens, while the other three were nearly grown young males. Without doubt four of them comprised a still united family of the present year, while five others seemed to represent another. To my surprise I could easily distinguish between three of the male birds. A solitary cock was the lightest of all, one of the young males appeared as dark as a black-breasted kaleege, while its brother was lightly vermiculated. I have described these in detail elsewhere. I watched the dainty birds, stepping high, like thoroughbreds, snatching an insect or leaping at some morsel on a leaf overhead, or picking up an acorn, ever alert and watchful. I remained as still as the tree-trunk at my back, and the birds descended half-way down the slope toward me.

Then two Kachin women, with silver cylinders and tassels in their ears, and great baskets on their backs, came along, chattering loudly. They halted when they saw me, and despite all my motions stood stupidly gaping at me for several minutes before they plodded on their way. The pheasants had, of course, retreated to cover, and when, twenty minutes later, they returned they were spread out more irregularly. I secured the light-coloured old male, which I had seen once before, while the others passed me on either hand, together with a jungle-cock, which in bearing and gait was not to be compared with the far more elegant and graceful pheasants. Except for a short, sharp alarm note and five minutes of silence, the rest of the flock paid no attention to the roar of the gun. As I had opportunity to notice on many other occasions, if one shoots from a thicket and makes no movement after firing, the birds seem to have no sense of direction of the danger, and are but little affected by the sight of their dead companion. When headed down toward water I have never known a flock to be turned back by shots fired in this way, and have secured as many as four from the same ambush.

As I shall describe in detail, even the two birds of the year which I later secured, although appearing exactly alike at a distance of forty feet, turned out to differ sufficiently to fit them to two of the so-called species of the closet taxonomists.

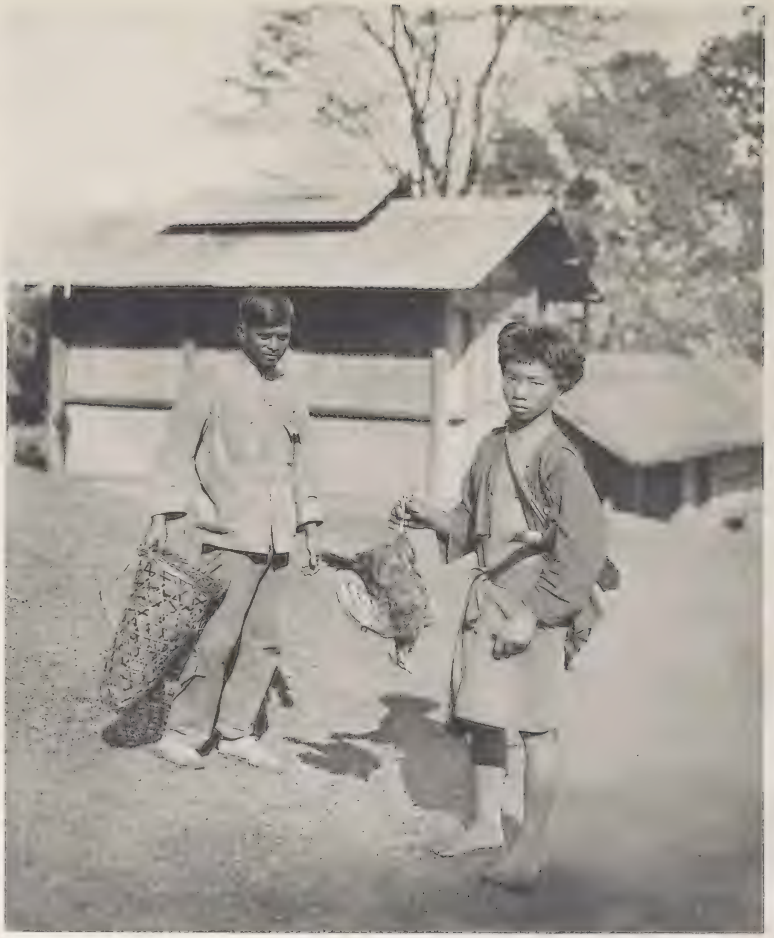
The following day the same route was followed by both laughing thrushes and pheasants, and on each of the succeeding six days, when my observations ceased. In no fewer than eight other flocks, or more properly families, of pheasants in the hills farther to the east I found the same interesting relation between the two different groups of birds.

Early in the morning the birds worked uphill toward the higher, warmer ridges rather irregularly and at no special time, early or as late as nine o'clock, as the fancy or abundance of food influenced them. At this time they kept together in small family parties, uniting with others only when starting down for the evening drink. Mid-day was spent in dense bamboo thickets or tangles of thorn palms, where observation of them was almost impossible. I once watched three birds apparently picking ticks from one another's heads, and even from under the uplifted wings, at full noon, in the dense shade of some fallen vines. Toward two in the afternoon of a partly cloudy day, or about three if the sun shone warmly and uninterruptedly, the pheasants began calling to one another in undertones—sweet notes which much resemble the voice of our own bluebird, without, however, the

A SANCTUARY OF THE HYBRID KALEEGE

The natives of northern Burma captured many specimens of Hybrid Kaleege for me, taking them either in deadfalls or in nooses. But there was one spot near their villages where they would never trap or kill. This was the sacred spot or grove devoted to the Nats or evil spirits. And here the pheasants were safe from molestation, and here they scratched for food and roosted high at night.

SACRED NAT GROVE, WHERE THE HYBRID KALEEGE ROOST.



NATIVE WITH HEN KALEEGE.

plaintive tremolo. The young birds—nearly in adult plumage as they were—now and then varied these sweeter notes with chick-like *seeps!* and *peeps!*

Gradually working together, with the laughing thrushes drifting along like scattered leaves or bounding with high, strong leaps over the low bushes and logs, all united in a loose flock, and began feeding slowly downward, usually over a southern slope. The greater activity of the thrushes usually carried them several yards in advance before they had gone far, but many times I watched the birds at a distance, and saw them keep together for a thousand feet or more of descent. In such a case I would locate the flock as it crossed an open space well up on the mountain, and making a detour, and concealing myself far below in the line of their descent, I would be almost certain to intercept them before they reached water. The thrushes were almost wholly insectivorous, while the pheasants chose animal and vegetable food in equal quantities.

Whether the relation is mutually helpful in any way or not, it certainly exists. And, as I have said elsewhere, while the association may be due solely to the social love of birds, it is certainly true that the laughing thrushes many times give the pheasants warning of danger visible from trees, which the latter on the ground could never detect until too late; then, while the pheasants scratched or pecked to pieces some fallen log, I have again and again seen several thrushes stand around, now and then springing into the air to seize an insect which had escaped by flight from the larger birds.

Two species of laughing thrushes are thus found in intimate association with the pheasants, the black-gorgeted and the black-throated. These were usually in separate flocks of from six to eighteen individuals, but now and then I observed both species feeding together. When a bare patch of ground or a wide trail is encountered, where they are suspicious of danger, the pheasants cross it by a quick dash, the laughing thrushes by a single scaling flight.

After drinking at the rivulet or pools in the ravine bottoms, by which time it is almost dusk, the birds fly up into trees to roost for the night. I have never actually seen this, being defeated either by the sudden descent of darkness or the wary scouting of the birds before they retire. But again and again I have heard the heavy, hollow beating against air and leaves as the birds reach a first and often a second branch before they settle down, after mumbling a few smothered, low notes. By aid of strong moonlight I have seen them sound asleep, seldom alone, but two or three close together, a few feet from the trunk, head under wing.

The few crickets whose instruments were not yet silenced by the chill of the autumn night still shrilled faintly; small owls hawked about after droning beetles; a podargus fanned my cheek like the ghost of a bird, and far off in the blackness, toward the wild Chinese mountains, came the moan of a leopard. As I turned homeward, a wind—first prophet of to-morrow's storm—rattled the bamboos, drawing forth weird sounds which seemed to verify the Kachin's belief in the spirit *nats* which wander along every trail at night searching for evil to do. For this reason these wild hillmen will never travel at night, and as I trudged toward camp from the sleeping pheasants, I knew that whatever dangers the darkness hid at that hour, it was from animal not human foes.

GENERAL ACCOUNT

After finding and studying the Himalayan kaleege, I later visited Burma, and there in the south first met with *lineatus*. My next studies took me to Mandalay, eastward beyond Maymyo, and northward toward the Ruby Mines District and Bhamo. I then spent considerable time in the Myitkyina District far up the Irrawaddy, and among the Shan Mountains to the east and south, to beyond the Yunnan border. Here, thanks to the exact details given me by Major Nisbett, I was able to collect and observe the birds at the very localities where the types were collected.

From this latter very limited locality six forms of *Gennaeus* had been recorded. Of these I found no perfectly typical specimens, but pheasants which approximated four, besides a fifth which was not supposed to occur here. In addition I collected birds which, if judged by the characters used in separating the already named forms, would supply at least four additional species.

The species supposed to inhabit this region are the following:—

1. *affinis*. (1 ♂ from the River Namli; two thousand feet; east of Myitkyina.)
2. *granti*. (1 ♂ from Puntum; six thousand feet; eight miles east of Sadon.)
3. *nisbetti*. (An imperfect ♂ from Mt. Kachin; twenty-five hundred feet; five miles east of Sadon.)
4. *cliffordi*. (The district in general.)
5. *batemani*. (The district in general.)
6. *horsfieldi*. (The district in general.)

At the locality from which *affinis* is recorded, the lower River Namli, I found only *horsfieldi*, which was dominant and almost typical, and a vermiculated bird associated with it which closely resembles the description of *obscurus*, but differed from it as much as do the most nearly related named species. The two forms were living in close association, the first flock containing three birds, all males, two of which were *horsfieldi*. In fact this was about the numerical percentage of the latter in this vicinity. On two occasions I saw a distinctly lighter bird in company with *horsfieldi*, but I failed to secure it. My next stop was at Pungatong, some twenty miles farther east, at an elevation of about four thousand feet. Here I located a flock of eleven kaleege, or what were probably two families of four and five respectively, and two single cock birds. Each afternoon these would unite and take the same route to water, down a gently sloping hillside covered with light forest, across the trail and on down to the stream at the bottom of a rather steep ravine. I watched these birds carefully day after day until I could actually recognize the individuals, in spite of the fact that they were usually well looked after by a mob of laughing thrushes. Then I began shooting, and secured no fewer than eight birds out of the eleven. This comprised all of one family of two parents and two almost full-grown young males in first year plumage, the adult male parent of the second family with a young female of the year, and both of the solitary cock birds—fully adult. The tale of individuals was as follows, using Oates' nomenclature.

Family Number One:—

1. Adult Male.—On the whole, this bird resembled *horsfieldi*, but it had the narrow rump fringe and lengthened tail of *batemani*, the intense blue, non-vermiculated

HOME OF RIPPON'S SILVER AND OF EASTERN HYBRID KALEEGE

Three of these rare hybrids crossed this trail one day, headed into a wild, deep gorge. The mountains rose high on all sides, except to the northward, where the purple distance ended in the jagged ranges of the unexplored tri-corner of Tibet, Yunnan and Burma.

Parrakeets and flycatchers screamed, and at last I heard the tremulous wing-whirr of a pheasant. But it was an hour later before the timid birds appeared—clad in ebony and white, walking slowly downward, on their way to the water at the bottom of the gorge.

HOME OF RIPPON'S SILVER AND OF EASTERN HYBRID KALEEGE

rump of *mearsi*, and, in addition, the scarlet legs and feet of *nisbetti*. The central tail-feathers were sparingly but strongly vermiculated with white for most of their length, the terminal fifth being clear black.

2. Adult Female.—This bird, which was constantly associated with the above cock (in fact, I secured both with one shot), was not distinguishable from females of *horsfieldi*, except for the somewhat longer tail. Well grown as were the two young birds, I saw this female more than once allow them to take food away from her, and from this and other actions, besides the constant association of the four birds before they joined the others for the afternoon's descent to water, there is not the slightest doubt that this was a single family of kaleege.
3. First Year Male.—Typical *horsfieldi* as found in Manipur, with tail of normal length, but with the basal vermiculation on the inner rectrices visible for a half-inch beyond the upper tail-coverts.
4. First Year Male.—Between *obscurus* and *davisoni*, with characters of each form.

The two following birds I judged to be parent and offspring :—

5. Adult Male.—Superficially close to *lineatus*, with somewhat coarser vermiculations, and with the outer webs of the outer tail-feathers almost unmarked black, as in *andersoni*. The central tail-feathers were vermiculated throughout, with no hint of a pure white area. There was no trace of a rump fringe.
6. First Year Male.—This bird does not correspond to the description of the females of any form. The general colour above is olive brown, very minutely vermiculated with black, except along the margins of the feathers, where, the black dying out, the pure olive brown shows paler and clearer. The primaries are brownish black, densely mottled with greyish-brown on the outer webs. The secondaries are similar, with the colour of the outer webs changing into that of the coverts and remainder of the upper plumage.

The chin and throat are white, tinged with brown along the margins. On the under parts the light colour persists as a well-defined buffy shaft-stripe. The rest of the feather is clear olive-brown, with but little mottling except on the centre of the lower breast and abdomen, where the entire feather is irregularly blackened especially along the enlarged shaft-stripe. The under tail-coverts are the blackest of all the contour feathers, most of them showing brown only along the margin. The outer and median tail-feathers are chestnut, obscurely but coarsely mottled with black. Toward the central pairs the chestnut changes to a brown, and the darker colour becomes a coarse vermiculation, the lines irregular and lying obliquely to the shaft.

The facial skin was scarlet ; the irides light hazel ; legs and feet pale, neutral, leaden grey.

I have gone into this in detail to show what variation I found among the females of this group of pheasants.

7. Adult Male.—One of the solitary males was *horsfieldi* in length of tail and general markings, except that there was more vermiculation on the central tail-feathers than I have seen in any bird from Assam, and the inner wing-coverts were strongly margined.

8. Adult Male.—The second male I shot on sight, and at such close range that I nearly blew it to pieces. At first glance it seemed to be a silver pheasant (*nycthemerus*), and stood out sharply from all its companions on both the occasions when I watched it working downhill. The second time I had my gun and secured it at once. It proved to be a very dark representative of what has been called *ripponi*, but differing in having greenish, instead of scarlet legs and feet.

All this astounding variety of kaleege I found within two miles of the dak bungalow at Pongatong, associating together, and, as I have said, with satisfactory evidence of being in families. Even if the birds were of no immediate relationship, the fact of their remarkable variation is none the less indicative of hybridism. This is typical of what I found to exist in other parts of Burma. The Arakan country and Annam I did not visit, and hence I cannot speak at first hand with regard to the birds which inhabit those regions.

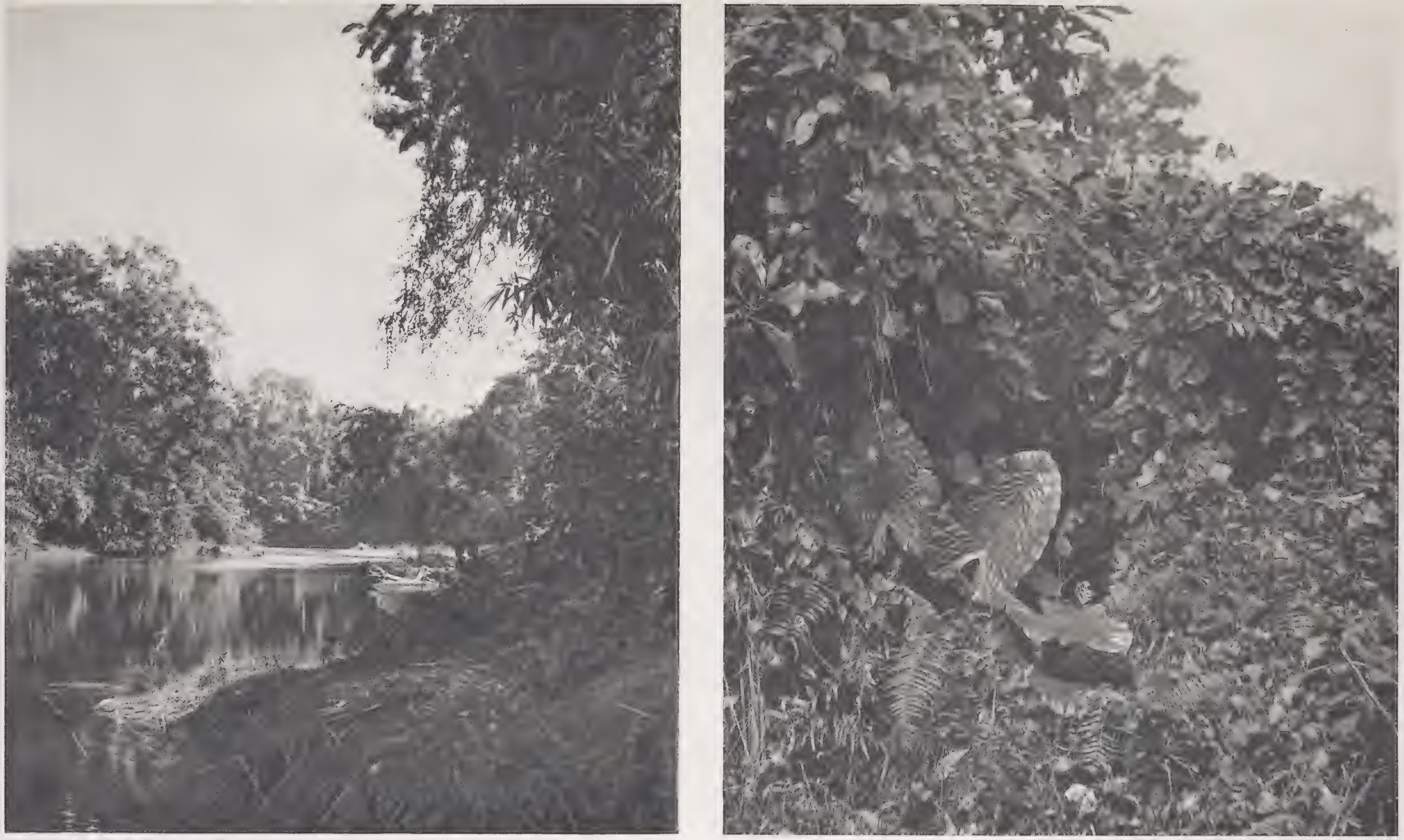
All the specimens which I gathered in northern Burma tend to exhibit this individual variation and blending of character, and in all my observations there is nothing to show any pronounced uniformity in the forms I have mentioned. But while thus being compelled to consider these as unworthy of specific validity, there is an interesting phase of the subject in regard to certain of the other forms. Some of these pheasants, which apparently owe their peculiar colour and pattern to the crossing of two feral species, seem to have found more or less isolated regions where they have become more or less established. It is difficult to know exactly how to treat these, and in my first review of this genus ("Zoologica," Review of the Genus *Gennaeus*) I admitted tentatively four forms or sub-species or fixed hybrids. But, as I have already said, more thorough examination of all the specimens available has shown me that it is a case of degree, not of kind, and as long as specimens typical of one of the three main species *lineatus*, *nycthemerus* and *horsfieldi* have been recorded from the heart of the intervening areas containing the hybrids, I see no reason to consider any of them as worthy of a name.

The sphere of influence existing between *horsfieldi* on the north-west and *lineatus* on the south-east is populated by an interesting series of hybrids, which, except in the case of the irregular mountain chains and cross valleys, show a fairly gradual gradation from the one to the other parent species.

I have chosen Cuvier's kaleege as the wild pheasant hybrid representing one of the first links in this chain of cross-breeding between true *horsfieldi* and *lineatus*. In shape and in general colouring it is similar to *horsfieldi*, being mostly bluish black with a white rump-fringe. But the feathers of the upper body-plumage, wings and tail are all finely and regularly pencilled with wavy white lines. The markings are like those of the Chinese silver kaleege reversed. The female resembles the female of *horsfieldi*, but the tail feathers are dominately rufous, mottled with black, the outer pairs being black toward the tips, and elsewhere pencilled with fine white lines. The average would seem to be 75% of *horsfieldi*, and 25% of *lineatus* blood. Specimens more or less like this are found scattered through the middle and northern Arakan Hills, extending into Chittagong.

HOME OF THE WESTERN HYBRID KALEEGE

In western Burma, where the ranges of Horsfield's and the Lineated Kaleege approach or touch, the jungles and lesser growth are inhabited by pheasants which show all degrees of intergradation. Their voice, habits, eggs and young are all more or less alike, but on the plumage of the adult birds is written their blood relationship to one or the other of their parents or more remote ancestors.



HOME OF THE WESTERN HYBRID KALEEGE

PHOTOGRAVURE PL[illegible] 22

The first mention of this form appears in the "Calcutta Journal of Natural History" in 1842, where it was described as a hybrid between *phasianus fasciatus* and *P. leucomelanos*. Temminck, in the first edition of his *Planches Coloriees*, distinguished it by the name of *lophophorus cuvieri*. Shortly after my tentative acceptance of this form as a sub-species in my 1914 review of the group, I realized that it was only another of the unusual types of wild hybrids, and Baker has independently come to the same conclusion.

Passing over the *williamsi* stage we come, as we go southward, to the forms of which that named *oatsei* may be taken as an average. This hybrid may be said to show 25% of *horsfieldi* and 75% of *lineatus*, and centres around the southern Arakan ranges. The white rump fringe is faint, but still distinct, and the dorsal vermiculations are only slightly fainter than those of *lineatus*. The outer webs of the central rectrices have got rid of much of their dark pigment, and are quite white. The female in both colour and pattern is thoroughly correlated with the stage of the male.

Ogilvie-Grant first recognized this as a sub-species in 1893, and Baker still clings to it. But in one specimen of *oatsei* which I secured, there is the bilateral asymmetry which indicates hybridism, and *lineatus* has been shot farther north than any *oatsei* thus far discovered. Less than a dozen specimens have been found, and they vary enough *inter se* to remove all doubt as to the true character of this one, among many forms.

RIPPONI-SHARPEI-NYCTHEMERUS HYBRIDS IN THE FIELD

My first meeting with any true silver kaleege was, as I have related, in Burma, some distance from the Yunnan frontier, when from a flock of much darker birds I shot one which belonged in the *nycthemerus-ripponi-rufipes* group, but which was not wholly typical of any good species or named hybrid. After crossing the Yunnan border, when the last outlying English fort had been left behind, I found traces of an even whiter bird. These were in the form of stray feathers in the sprung dead-falls of the Kachin trappers. They belonged to birds which had been caught, but discovered and eaten by civet cats before the hillmen had had opportunity to go their rounds.

Later I saw a flock of these birds and shot one, which was typical *ripponi*. On this occasion I was part way down the slope of a wild gorge, on a late afternoon in December. The mountains rose high on all sides except to the northward, where the long slopes dove-tailed one another, punctuated by two majestic peaks, and ending in the purple distance in the jagged ranges of the unexplored tri-corner of Tibet, Yunnan, and Burma. No huts were in sight, but from a side valley came faintly the weird, nameless mouthings of a tongueless Kachin cur.

The hillside jungle showed a dozen shades of green, with here and there a blur of delicate pink, marking the unseasonable blossoming of a wild cherry tree. One close overhead radiated a hundred sprays of coral bloom, all ahum with insects drawn by the nectar, while the branches themselves trembled with the perchings of many fly-catchers, attracted in turn by the insects.

Now a hoarse chorus came from a dense flock of parrakeets, and soon afterward the tremulous wing whirr of a kaleege. This sent me down at once on my knees among the scanty dwarf bamboo and everlastings, alert for another hint of the birds which I was seeking. A crash of leaves and twigs drew my attention to the right along the slope, and I grasped my three-barrelled gun. A brace of tigers had taken toll of mules not far away, but this alarm ended in silence and mystery.

An hour passed with no sound of pheasants to reward my patience. Then a cloud blotted the sun, and a chill followed the warmth and stilled the humming insects. A wind rose, and even when the long, slanting rays at last shone forth, the cold of night still filled the air. I crept slowly to a projecting spur, and found the wind blowing freshly on the other side. The moment it blew against my face I heard, a short distance away, the scratching which always meant pheasants of some kind. Twice a bird whirred, and then, walking slowly downward, on the way to the water at the bottom of the gorge, there appeared a stately kaleege, clad in ebony and silvery white. This was a time when I wanted the bird more than any hint of its life-history which observation in the failing light might give, so I raised my gun and fired. Two more birds burst forth from the feathery bamboo, and on wide-spread vibrating wings flew and finally scaled down the great gorge, until their white forms were swallowed up in the darkness far below. Only a few weeks before, I had watched the blackest of all the kaleege not far from the banks of the Irrawaddy, and here were the outposts of the silver clan, which stretched on and on to the eastward until fairly stopped by the shores of the Pacific.

This ended my personal experience with this form. I had known that it (+ *jonesi*) was believed to range widely over Yunnan and the Shan country. Not, however, until I had access to an unexpected and unusually large amount of material was their wide distribution proved beyond doubt. For a year or more a Chinaman had assiduously collected silver kaleege pheasants in various parts of Yunnan and the Northern Shan States, and when he had gathered six large bales, he boxed them up, labelled them "ducks' feathers," and shipped them via Bhamo to Rangoon, en route to the milliners of Europe. But the Custom officials at Rangoon, having had previous experience with Chinamen and with ducks' feathers, investigated, and in place of the feathers of domestic ducks, found hundreds of skins of silver kaleege, with a scattering of Lady Amherst and Burmese bar-tailed pheasants. The bales were promptly confiscated and condemned, and at the moment when awaiting destruction I was fortunate enough to come across the great mass of skins. I began at once to set official machinery in motion, and with the help of a very amiable collector of customs and Dr. Annandale of the Indian Museum, the entire lot was turned over to me. I spent considerable time in studying the fragments, and later the best skins were picked out and sent to me.

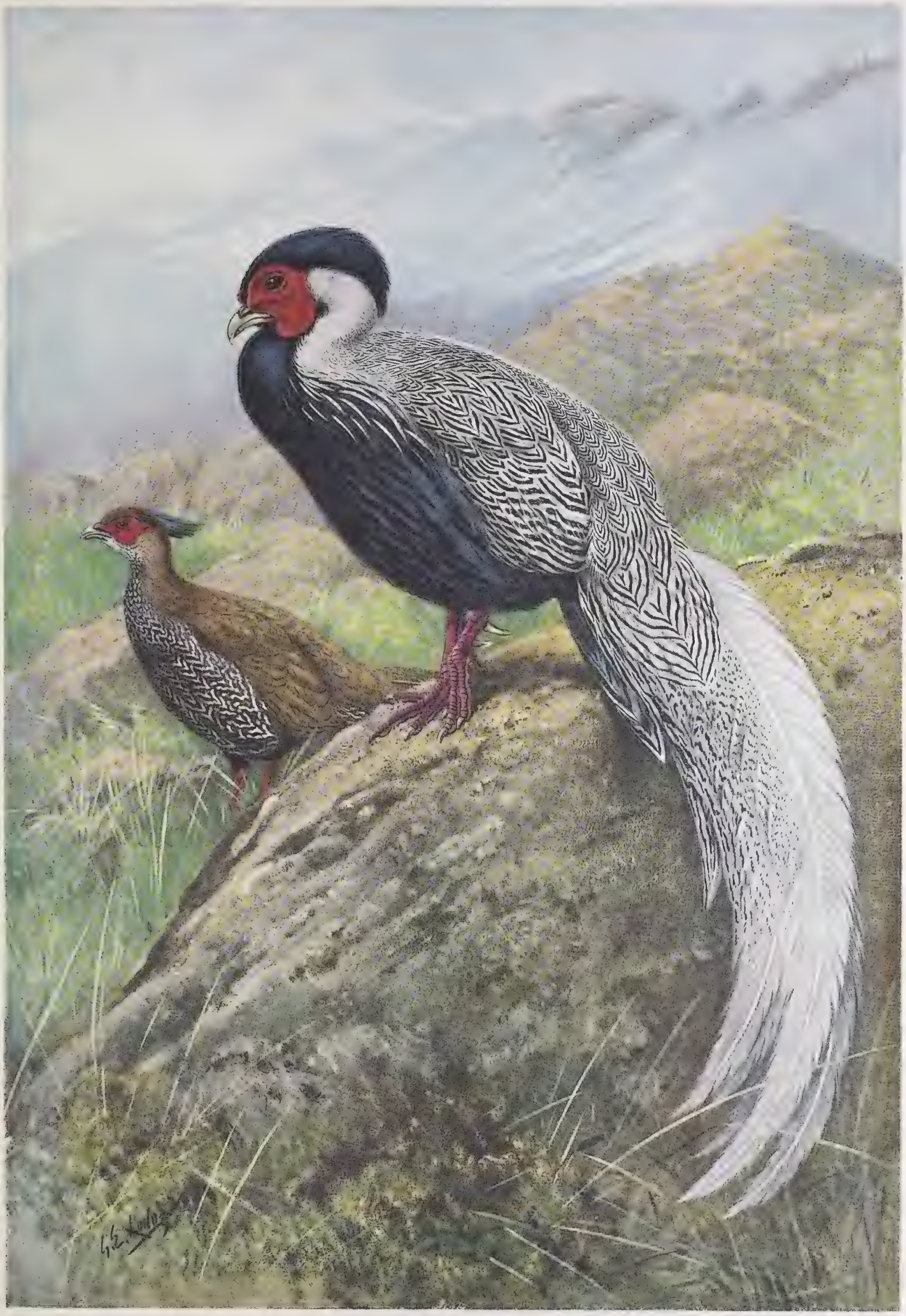
I found that in one bale about twenty-five per cent. were pure *nycthemerus*, while sixty per cent. were equally typical *ripponi*, the remaining fifteen per cent. showing intermediate grades between the two. Later I compared this lot with several *ripponi* skins and found them about identical, though fluctuating slightly in the direction of whiter *nycthemerus*, or with the blacker shades of the so-called *rufipes*.

Since the above was written I have examined the specimens in the other bales, with still more interesting and significant results. About thirty-five per cent. were *nycthemerus*, fifteen per cent. might be *rufipes*, another fifteen were *sharpei*, twenty per cent. approached *ripponi*, five per cent. were close to *horsfieldi*, while the remainder were anomalous.

I have presented considerable data based on observations in the field to show how variable were birds even in the same flock in certain parts of Northern Burma. I do

RIPPON'S HYBRID SILVER KALEEGE

THIS bird has been given a name (*Gennaeus ripponi*), but no two birds are alike, and there is no doubt but that it represents individuals which have a very large percentage of the blood of the Silver Kaleege, with a relatively small amount of Black-breasted ancestry. I found a typical bird in a flock of eleven in northern Burma. They showed great variation, and could not be classified with any specific exactness, and only one approached the description of this hybrid form.



RIPPON'S HYBRID SILVER KALEEGE.

not intend to go into similar detail in regard to all the kaleege which have received names, and one instance must suffice. I have taken a series of specimens in the *rufipes-sharpei* group, the chief hybrid buffer forms occurring between *lineatus* on the west and *nycthemerus* on the east, and examined them carefully with a view to recording the variation, not only in the adult birds, but in immature pheasants, in juvenile and first year plumage. This series of some thirty-five birds is chiefly from my own collection and from the Tring Museum. The localities show that the variation is absolutely not dependent on environment, some of the extremes coming from the Ruby Mines district, while equally variable specimens were collected far to the southward.

DETAILED DESCRIPTION OF KALEEGE OF THE *RUFIPES-SHARPEI* GROUP, RANGING FROM MOGOK IN THE RUBY MINES DISTRICT TO PAZAUNG IN THE SOUTHERN SHAN STATES.

Adult Male.—Facial skin well developed, scarlet; forehead, chin and throat dull black; long flowing crest shining steel blue; longest feathers 80 mm. Entire ventral surface dead black down the middle of breast and belly; the flanks, thighs, and under tail-coverts with wide, shining, steel-blue margins. Ear coverts white, spotted and indistinctly banded with black.

Feathers of nape immediately behind crest white, with an excess of black in the form of a wide, elongated shaft-patch, a concentric line, and a narrow margin. On the feathers of the anterior upper neck the black decreases in amount, but has the same pattern. As we go back, the number of black lines increases. The method of this increase is by the expansion of the shaft-spot into an elongated kite-shaped band, when at once another spot of black appears in the centre, which a few rows posteriorly will in turn expand into a more or less circular band and give rise on the shaft at its centre to the *anlage* of the succeeding black line.

By this process of increase we find on the mantle five concentric lines on each web (one marginal), each pair joining on the shaft, besides a narrow shaft-streak, within the inner or fifth. There is no suggestion of convergence of the lines proximally, as they run straight backward, and disappear at once in the monochrome grey of the basal down.

On the midback a sixth line has appeared, there being six well-developed concentric pairs, and a seventh or even eighth on the rump (always counting the narrow black marginal fringe as a true line).

On the median and longer tail-coverts we find a new method of linear formation in progress, namely, the insertion of new lines between the old, appearing first as mere mottled streaks, and, in addition, the coalescing of lines near the posterior margins, the lines now lying obliquely to the shaft and not parallel, the outermost (as well as the marginal) extending unbroken the entire length of the feather, but the inner ones dying out or coalescing with others.

On the central rectrices we find this pattern carried at once to an extreme, but with such variation that the feathers may be said to be black, banded obliquely with white. The amount of white increases from the outer feathers inward, and in some specimens the inner webs of the central rectrices are almost wholly white.

The length of the tail is extremely variable, and I have recorded the length of the full-grown, central tail-feathers of two adult males shot on the same day, as 380 and 475 mm. respectively.

A much simpler pattern than that of the mantle and back is seen on the wing-coverts. On the lesser and median feathers we find two concentric rings and a black margin, the black lines on the latter being very wide. But the greater coverts show a sudden change to oblique or almost transverse cross barring.

On the scapulars there are four or five concentric black bands, but quite suddenly, on the innermost secondary, we find the transition to oblique cross-barring, and with this, strong, dark, linear mottling in the narrow white interspaces, as if hinting of linear increase as in the rectrices. Thus on the outer secondary we find thirteen or fourteen broad black cross-bars separated by narrow interspaces, all of which are split by a mottled dark line. The primaries show so little white that one must reverse the colour value in describing the pattern. The ground-colour is not black, however, but dark brown, across which numerous narrow, white, oblique bands extend on both webs, each white band split by a mottling or solid bar of brown.

The above description represents one type of pattern. Another, equally common, shows no dark bar splitting up the cross white bars. A third shows the primary markings so numerous, broken, fine, and wavy that they are rather vermiculations than bars, and defy counting. Bill from nostril, 20 mm.; wing, 240 to 280; tail, 360 to 530; tarsus, 90; middle toe and claw, 70; spurs, 28 mm.

Immature Males.—A young bird which shows no adult characters is one of the severest and plainest of birds. Forehead and crown brown, unmarked. Occipital feathers rather elongated into a short crest. Feathers of neck all around show a large, central, pale buff area with numerous wavy cross-bars.

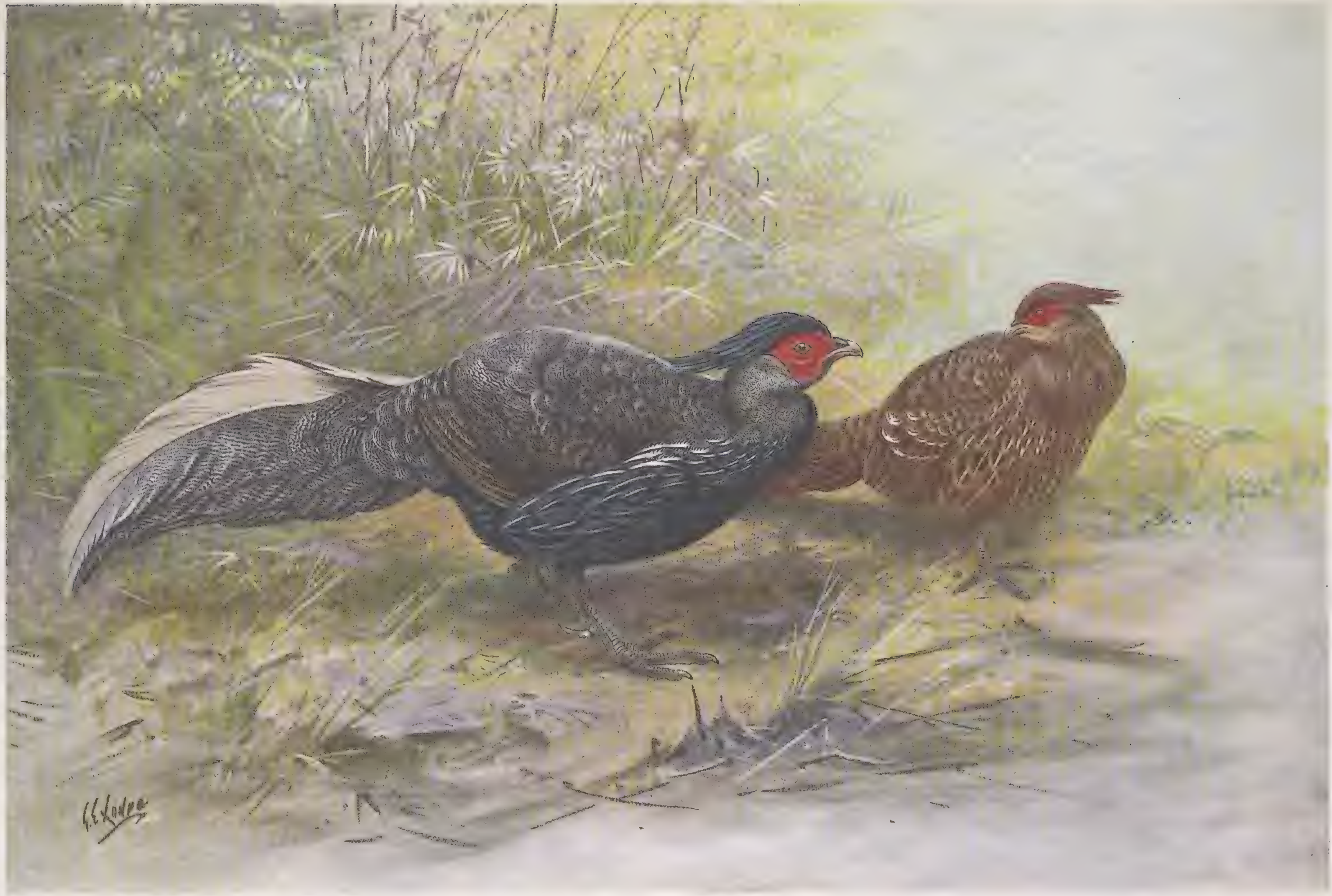
Posteriorly on the mantle, back, rump and wings, this central area merges again with the rest of the feather. The ground-colour is a rufous buff, vermiculated with oblique, fine, wavy black lines. The secondaries are plain dark brown on most of the inner web, and the primaries are wholly brown. The delayed ninth and tenth primaries show irregular white wavy streaks on the inner web, the only hint of the adult plumage. The other rectrices are very irregularly marked with rufous mottling on dark brown. The lower throat and breast show distinct traces of the central lighter area, but all the remaining under surface is identical with the back.

This is the normal plumage of this moult, but very few individuals show it in perfection. In fact, no two young males are alike, and when the moult has entirely ceased we find all kinds and conditions of infusion of adult patterns and pigment, grafted upon correspondingly more or less strongly marked juvenile plumage.

The adult character which shows the most pronounced precocity is the black ventral surface, appearing usually as a broad band from the throat to the under tail-coverts. The feathers are as often parti-coloured as black, the brown pigment manifesting itself most frequently as a mottled shaft-stripe and a wide margin. With this character we find correlated a considerable development of the steel blue crest, these feathers being sometimes quite pure, without admixture of brown, this latter colour, when it occurs, being confined to the terminal third of the feathers. The elongated juvenile crest growing side by side detracts from the adult appearance of the flowing blue feathers.

OATES'S HYBRID KALEEGE

THIS bird, which some ornithologists have considered to be a species (*Gennaeus oatesi*), shows great variation in the dozen skins I have examined. We must either give a half-dozen new names to them or consider them as hybrids. Oates's Kaleege represents birds with the blood both of the Black-breasted and Lineated Kaleege, but the latter greatly dominant.



OATES'S HYBRID KALEEGE.

The wings are quite conservative and are usually wholly juvenile. A slight advance is sometimes seen in the form of a well-marked sub-terminal band, extending entirely around the visible margin, with a terminal band of buff. This gives the wing a very elegant appearance, the monochrome of vermiculated rufous brown broken by the distinct outlining of each feather. In such a wing the adventitious growth of a secondary presents a startling intrusion of black and white, developed, curiously enough, only on the visible portion, the remainder of the feather being quite juvenile.

The tail is perhaps the most variable factor of all, and hardly any two birds have it alike. The central rectrices in particular vary from warm buff, everywhere thickly vermiculated with wavy, dark brown lines, to the other extreme, which is pure white, with thick, wavy, oblique, black lines on the outer web, the inner being white except for a few linear mottlings near the shaft.

Whatever the condition of the inner rectrices, the outer are invariably more juvenile, more tinged with brown, the outer pair being sometimes quite rufous and brown, thus reflecting vividly the gradual moult from the outside inward.

Two or three immature males which have acquired adult tails show as much variation as exists in fully adult birds; from an excess of black banding over all the feathers to the excess of pure white over the inner webs of the central pairs. So this is wholly *individual* variation.

In birds acquiring the full adult moult, the numbers of concentric black lines on the dorsal plumage, in number and variability, *correspond exactly* with those in the adult bird.

The young birds show all shades of feet and legs, from pale brown through flesh colour to deep rich scarlet.

ADULT FEMALE.—Upper parts brownish buff, everywhere very faintly mottled with darker. Feathers of rear crown and occiput rather more mottled and elongated into a crest. Wings the same, becoming a shade more rufous on the secondaries. Primaries plain dark brown on the inner webs. Rectrices present considerable variation, some with the lateral feathers showing much more contrasted markings than others. In the more common type the central rectrices have a ground-colour of pale buff, finely vermiculated with dark brown, while as we proceed outward, the feathers increase in intensity of rufous colouring, and the markings become less alike on the two webs, the outer webs being mottled, the inner obliquely banded with pale buff, these markings being indistinctly outlined in black.

Chin and throat white, the feathers posteriorly with a rapidly increasing central spot and margin of brown, until on the breast the white is reduced to one or two concentric rings. This pattern, but with considerable variation, covers the entire ventral surface. From two to four buffy-white and dark-brown concentric rings or oblique cross-bars show all variations, from a rarer pattern of very regular, concentric markings to the more usual appearance of broken, spotted, irregular cross-bands. This is wholly individual.

In well-authenticated skins I find none of the radically characteristic homogeneous types of females which have been accredited to these and related so-called species of the group. The females of typical *sharpei* near the Ruby Mines district are most assuredly not like *lineatus*, and of those from farther south I have never seen two quite alike. Bill from nostril, 20 mm.; wing, 250; tail, 268; tarsus, 85; middle toe and claw, 63 mm. Spurs sharp, but very low nodules.

In conclusion, the kaleege pheasants forming the genus *Gennaeus* seem to me to warrant the following disposition :—

FULL SPECIES

lineatus
horsfieldi
melanonotus
leucomelanos
albocristatus
nycthemerus
whiteheadi
edwardsi
swinhoei

HYBRIDS

affinis
andersoni
annamensis
assimilis
atlayi
batemani
beli
cliffordi
cuvieri
davisoni
elegans
granti
haringtoni
jonesi-ripponi
macdonaldi
mearsi
nisbetti
oatesi
obscurus
ommansyi
prendergasti
ripponi
rufipes
sharpei
wickhami
williamsi

SUMMARY OF NAMED HYBRID *GENNAEUS*

affinis Oates, Ann. Mag. Nat. Hist. (7), XI. 1903, p. 231; single male killed by Major Nisbett, river Namli east of Myitkyina.

andersoni Elliot, Proc. Zool. Soc. London, 1871, p. 137; type in Indian Museum, Calcutta; several specimens; Anderson in Yunnan; Rippon at Warar Burn, 6000 feet, in Kachin Mountains, 30 miles east of Bhamo.

annamensis Grant, Bull. Brit. Orn. Club, XIX. 1907, p. 13; type in British Museum; three specimens; Vassal, Bali region, interior of Annam.

assimilis Oates, Ann. Mag. Nat. Hist. (7), XIV. 1904, p. 286; types in Oates Collection, British Museum; six specimens, Ruby Mines District.

atlayi Oates, Ann. Mag. Nat. Hist. (8), V. 1910, p. 162; types in Oates Collection, British Museum; seven specimens, Atlay, Ruby Mines District.

batemani Oates, Jour. Bombay Nat. Hist. Soc.; types in Oates Collection, British Museum; eight specimens, Districts of Katha, Myitkyina and Bhamo.

beli Oustalet, Bull. Mus. Nat. Hist. Paris, 1898, p. 258; types in Paris Museum; several specimens, Bel, Eastern Annam between Hue and the mountains.

cliffordi Oates, Ann. Mag. Nat. Hist. (7), XIV. 1904, p. 286; types in Oates Collection, British Museum; six specimens, Myitkyina District, east of Irrawaddy.

cuvieri Temm., Planches Coloriees, V. pl. 10, 1820; about a dozen specimens; the hills of northern Arakan and irregularly to the north-east.

davisoni Grant, Cat. Birds British Museum, XXII. 1893, p. 304; type male in British Museum; type female in Oates Collection, British Museum; about ten specimens, vicinity of Bhamo and in Yunnan.

elegans, listed in Oates Collection.

granti Oates, Ann. Mag. Nat. Hist. (8), V. 1910, p. 163; type in British Museum; single male; Nisbett, Puntum, east of Sadon.

haringtoni Oates, Ann. Mag. Nat. Hist. (8), V. 1910, p. 162; types in Oates Collection, British Museum; single pair; Harington, Milum Kha, Bhamo District.

jonesi Oates (*ripponi*), Ibis, 1903, p. 97; types in British Museum; distribution same as *ripponi*.

macdonaldi Oates, Jour. Bombay Nat. Hist. Soc., XVII. 1906, p. 10; type male in Oates Collection, British Museum; specimens from Chin Mountains, from Mt. Victoria to Fort White.

mearsi Oates, Ann. Mag. Nat. Hist. (8), V. 1910, p. 164; type male in Oates Collection, British Museum; several; Mears from Sylhet; Bateman from Kamaing, Myitkyina District; also from North Khasi Hills, Manipur, Tippera, and Goalpara in Assam.

nisbetti Oates, Ibis, 1903, p. 99; type male in British Museum; incomplete skin of male; Nisbet, five miles east of Sadon, 25,000 feet.

oatsei Ogilvie-Grant, Cat. Birds British Museum, XXII. 1893, p. 306; types in British Museum; eight specimens; central and southern hills of Arakan.

obscurus Oates, Ann. Mag. Nat. Hist. (7), XIV. 1904, p. 283; type female in Oates Collection, British Museum; specimens from Katha District.

ommansyi, listed in Oates Collection.

prendergasti Oates, Jour. Bombay Nat. Hist. Soc., XVII. 1906, p. 10; specimens from North Arracan.

ripponi Sharpe, Bull. Brit. Orn. Club, XIII. 1902, p. 29; fifteen specimens, Northern and Southern Shan States and Yunnan.

rufipes Oates, Manual Game-birds India, Part II. 1899, p. 495; type female in Oates Collection, British Museum; specimens from the Chin Mountains.

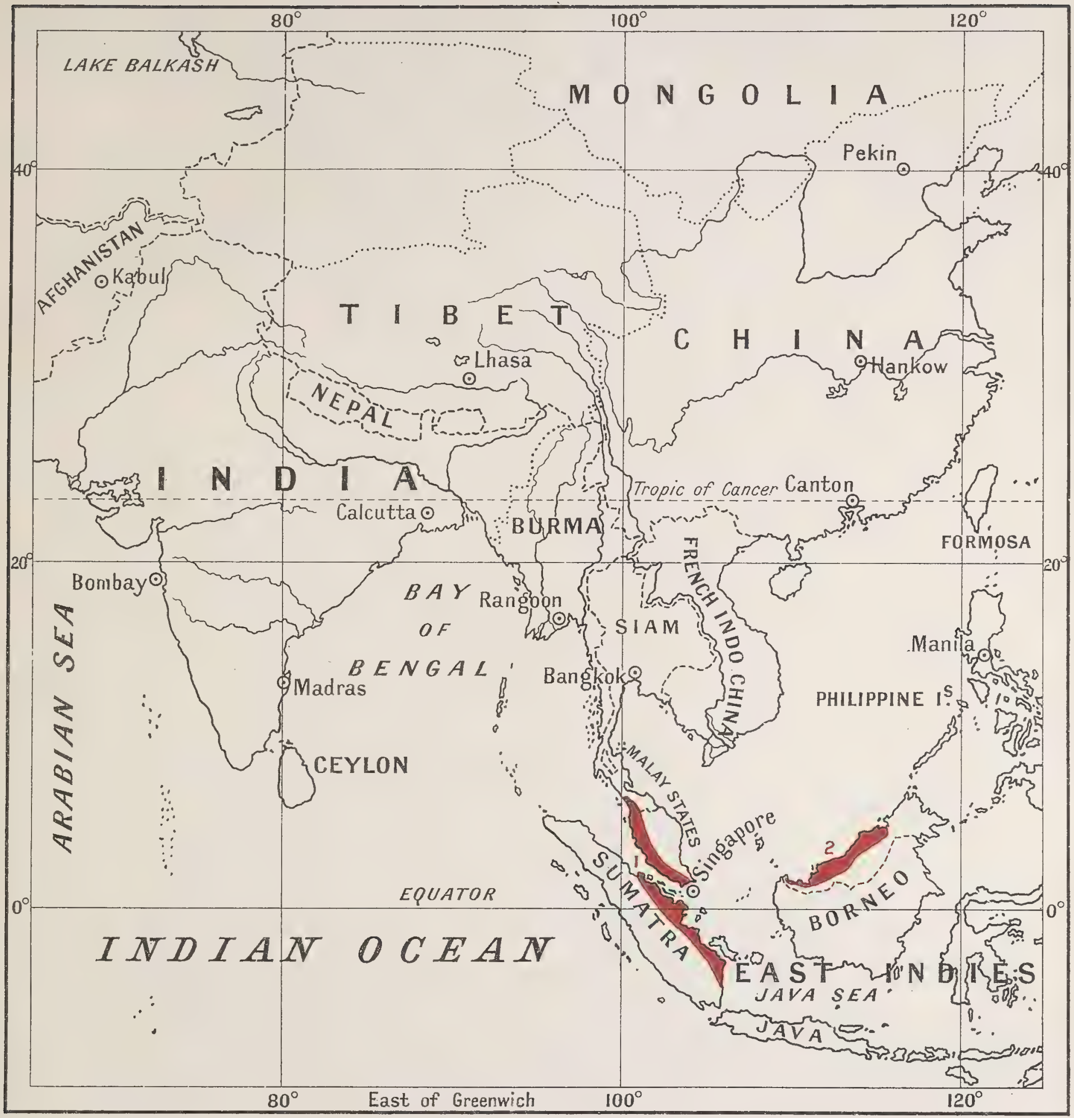
sharpei Oates, Manual Game-birds India, Part I. 1898, p. 357; type in British Museum; seven, Southern Shan States and Salwin country to the north of the river.

wickhami Oates, Manual Game-birds India, Part II. 1899, p. 495; type female in Oates Collection, British Museum; specimens from the Chin Mountains.

williamsi Oates, Manual Game-birds India, Part I. 1898, p. 342; over thirty specimens in Oates Collection; between Chin Mountains and the Irrawaddy; Williams, from Kalewa; others at Chindwin, near Wuntho.

ACOMUS

CRESTLESS FIREBACK PHEASANTS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Pekin
AFGHANISTAN
Kabul
TIBET
CHINA
Lhasa
Hankow
NEPAL
INDIA
Tropic of Cancer
Canton
Calcutta
BURMA
FRENCH INDO CHINA
FORMOSA
Bombay
BAY OF BENGAL
Rangoon
SIAM
Manila
ARABIAN SEA
Madras
Bangkok
PHILIPPINE Is.
CEYLON
MALAY STATES
Singapore
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SUMATRA
BORNEO
EQUATOR
INDIAN OCEAN
EAST INDIES
JAVA SEA
JAVA
East of Greenwich

H. F. & G. Witherby, Publishers.

Stanford's Geograph! Estabt.

MAP SHOWING THE DISTRIBUTION OF THE CRESTLESS FIREBACK PHEASANTS.

Region 1. Acomus erythrophthalmus.
„ 2. „ pyronotus.

ACOMUS

CRESTLESS FIREBACK PHEASANTS

Family PHASIANIDAE

Subfamily PHASIANINAE

Genus *ACOMUS*

THIS small genus of pheasants is unquestionably rather closely related to the crested firebacks (*Lophura*) and more distantly to the silver pheasants (*Gennaeus*), but instead of lumping all three, and thereby relegating their differences to the obscurity of subgeneric rank, I consider that the groups are sufficiently distinct to warrant giving to them full generic value.

The chief point of difference between *Acomus* and *Lophura* is the extremely masculine pattern and colour of the plumage of the females in the former genus, together with the less important total absence of crest in both sexes and the very small size.

The side of the head is bare and covered with fine papillæ; the wattles are very small, but the bill is of moderate size; the tarsus is extremely long, its length relative to that of the middle toe and claw being 3:2; the primary formula shows the 1st much shorter than the 2nd, which is about the length of the 10th, the 6th being slightly the longest. The tail is composed of fourteen feathers, quite short and compressed laterally, like that of a domestic hen. The third pair is the longest, the outer being considerably the shortest of the seven. Spurs are present in both sexes. The general colour is bluish-black, the males having white vermiculations or streaks, highly iridescent back and rump, and buff tail-feathers.

The Crestless Firebacks number two well-known distinct species and a third extremely doubtful one. For reasons given elsewhere I shall not recognize this latter form in my treatment of the genus. They are confined to the southern part of the Malay Peninsula, Sumatra and Borneo.

Malayan Crestless Fireback	*Acomus erythrophthalmus* (Raffles).
Bornean Crestless Fireback	*Acomus pyronotus* (Gray).

KEY TO *ACOMUS*

I. Plumage not uniform bluish-black (males)
    (*a*) Breast almost uniformly dark . . . . *erythrophthalmus*.
    (*b*) Breast with conspicuous white shaft streaks . . . . . *pyronotus*.
II. Plumage uniformly bluish-black (females) . . . . { *erythrophthalmus*. / *pyronotus*. }

(*Pyronotus* females *average* slightly larger, and show somewhat stronger bluish gloss, but variation is too great to render these characters of diagnostic value.)

MALAYAN CRESTLESS FIREBACK

Acomus erythrophthalmus (Raffles)

NAMES.—Generic: *Acomus*, *ἄκομος*, hairless, referring to the absence of a crest. Specific: *erythrophthalmus*, *ερυθρός*, eruthros, reddish; *ὀφθαλμός*, opthalmos, eye; with reference to the red facial skin. English: Malayan Crestless Fireback, Rufous-tailed Pheasant; French: Faisan a queue rouge; German: Gelbschwänziges Fasanhuhn; Native: Burong mêrah mata (Red-eyed Bird); Kuang bertam or Mata mêrah (Malay).

BRIEF DESCRIPTION.—Male: Head dark brown; lower back bronze-gold, changing posteriorly into bronze-red; tail buff; remaining plumage steel-blue, freckled on the back, sides and wings with white; face scarlet. Female: Head dark brown; entire plumage, wings and tail shining steel-blue; flight feathers and belly dull brownish-black.

RANGE.—Southern part of the Malay Peninsula and Sumatra.

GENERAL DISTRIBUTION

THE Malayan Crestless Fireback inhabits the southern part of the Malay Peninsula. It has been recorded as far north as Kedah (6° N.), but is apparently abundant neither there nor in Perak. As we go southward we find more and more evidence of its occurrence, especially in the low country of the west coast, throughout Selangor, Negri, Sembilan, Malacca and Johore. I found no trace of this species in any of the central mountains or elevated regions of the peninsula, nor on the east coast, although indeed much of the latter region is still unexplored. My studies of the bird were made chiefly in northern Johore.

The locality "Java" is an error, and no confidence can be placed in the old skin labels "Singapore" and "Penang." These were the first settled parts, and in those days stood for the whole region, just as the word "India" meant anything from Ceylon to Tibet. There is no foundation for belief that this species ever inhabited either of these islands. In Sumatra it is found along the eastern coast, but does not extend into the mountains of the interior.

GENERAL ACCOUNT

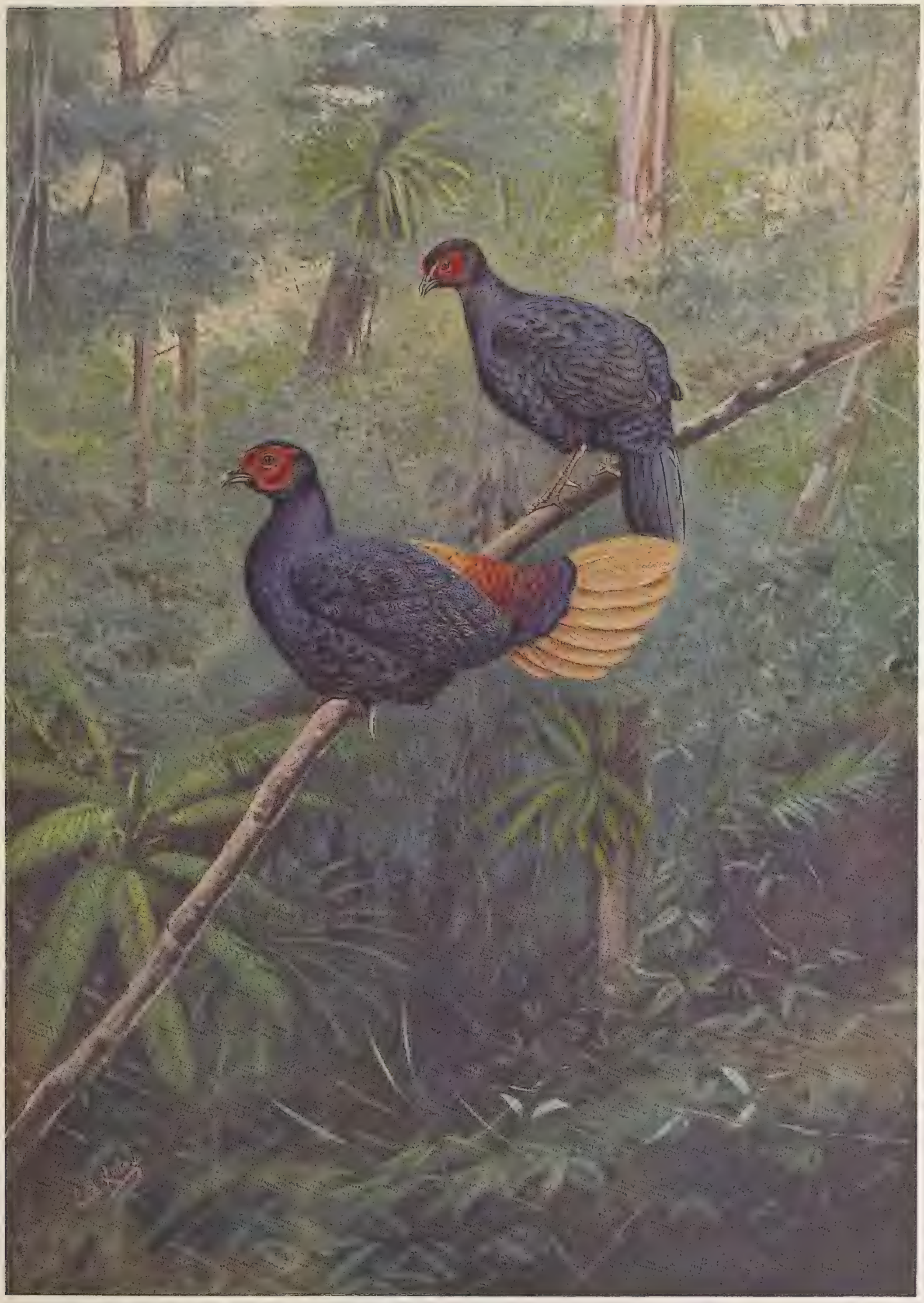
A careful search through ornithological literature shows that our ignorance of the life and habits of this bird is complete. Not a single fact has been recorded, and as far as I know, only native Malays have heretofore had the good fortune to catch even a glimpse of them in their native jungles. I went to Johore expecting to find this species the commonest of all the pheasants of that region, always, of course, excepting the junglefowl. But I found that while they shared with the latter the habit of frequenting the vicinity of native villages and the more open jungle where the half-domesticated buffaloes roamed, they were exceedingly shy, and I actually had as much difficulty in getting even the barest outline of their life-histories as in the case of the much rarer argus and bronze-tailed peacock pheasants.

MALAYAN CRESTLESS FIREBACK

Acomus erythrophthalmus (Raffles)

THESE birds are exceedingly pugnacious, and I have even seen hens fighting madly with each other. Both sexes are armed with spurs. They live along the small creeks which wind through the low jungle, and haunt the water-holes of the buffalo. The sound of warning or challenge, uttered when two cocks threaten one another, is a deep, hoarse drawl, almost a snarl, sounding as much like a small cat as a pheasant.

PLATE XXXIII.



MALAYAN CRESTLESS FIREBACK.

My first glimpse of the Malayan Crestless Firebacks was wholly unexpected, and came while I was completely absorbed in other forms of life.

For three hours or more, since early dawn, I had been creeping on all fours, or progressing in a still lowlier position, stalking and observing junglefowl. I had started inland from the bank of a small river in central Johore, and had become rather confused and uncertain as to the most direct route back. I knew, however, that a sight taken from any tall tree would set me right, so I chose a hidden resting-place in a shady, partly dry spot, beneath a small forest of giant caladium-like growths, and became absorbed in a pair of tumble-bugs revolving their diminutive globe. They had gleaned from the sleeping-place of a mouse-deer and had kneaded the clay and prepared their tunnel. Their methods differed in no way from their kindred all over the world. Exactly thus had I seen them push and tug on the sand of Egypt before the tombs of Sakkara; thus had they done before me in a Virginia pasture and a New England roadside. I found later that more than one pheasant had accepted these hard, horny morsels as food, breaking them in pieces, but swallowing hard elytra and thorax as well as soft body.

My reverie was suddenly interrupted by a wasp which hovered so close and so angrily that I left at once. A tropical wasp nearly two inches in length is as dangerous to health as a strong attack of fever. To my dismay I discovered behind me a herd of water buffaloes coming slowly along one of their trails. I shifted quickly to a position between two small trees, either of which I could mount swiftly. A person who has once been charged by buffaloes puts dignity out of mind at once on their appearance. For ten or fifteen minutes they grazed near me, fortunately keeping up wind.

Then came a sight for which I was wholly unprepared. Trotting along the trail came a string of birds—a glance showed they were Crestless Firebacks, twenty-two in all, about an equal number of males and females. They passed not more than fifty feet from where I crouched, straight through the herd and on out of sight. This was well worth the siege of the buffaloes, which I raised by an elaborate circling, and, knowing they had come from the river, I followed on their back track, and in twenty minutes was at the camp, eating breakfast. Why so many birds should be together I could not tell, unless it is the habit for several families to unite after the young birds have reached full size.

I had one other glimpse of these birds in this locality. I had gone far beyond the buffalo ground into light jungle. Green, black-faced babblers were everywhere, hanging to the leaves and twigs in their strenuous search for insects. Long-billed sunbirds dashed about me, uttering sharp *tsips*, and a little squeaking on my part drove them to the highest pitch of excitement. Now and then two or three hornbills passed high overhead, with their alternate flap and soar like pelicans. One of the most characteristic sounds of the Malayan jungles is the deep, soft, *whoof! whoof! whoof! whoof! whoooooooooof! whoof! whoof! whoof! whoof! whooooof!* of their great pinions.

A number of gibbons had just finished their morning's chorus, and were swinging about the trees just ahead, making a tremendous racket, while at the same time they fed on some gourd-shaped fruit. Now and then a head would swing up into view, eye me keenly and hurl a few hoots at me. They kept my advance under most careful observation. A junglefowl scampered away with a fowl-like, broken cackle of fright.

A few yards ahead I heard now and then a muffled scratching of leaves. Fortune favoured me, and after many minutes of most painstaking stalking, I reached a good point of observation. For a long time I could make out nothing but a confused dark mass tumbling about—first falling over one side, then the other. My low-power glasses at last showed me it was two Fireback hens waging a battle as fiercely as any game-cocks.

Breathlessness was the only cause of stopping, and even when both seemed completely exhausted, they clung together, and from time to time gave wholly ineffectual pecks at one another. Their wings dragged, their feathers were ruffled, and they were altogether most disreputable-looking females. Finally, thinking they were so spent that I could catch them with my hands, I walked toward them. But though their combative strength was spent, they had reserve enough to run quickly off when they saw me coming.

The comparative similarity in colour of the sexes of this species, and the presence of spurs in both, would indicate that courtship was a more or less reciprocal affair, and the fight of the hen birds which I witnessed would also support this conclusion. On the other hand, there are good reasons for supposing that this species is more or less polygamous, and if such is the case, any such theory would fail to explain the facts.

Further observation showed that these birds were more numerous along the smaller creeks which traversed the low country, and that they haunted the water-holes of the buffaloes in early morning. They have apparently no regular place of fighting, but pitch into one another whenever and wherever the spirit moves them.

Birds which become badly injured in these encounters or are otherwise disabled or weakly have short shrift. Leeches and ticks do their work even before the keen noses of carnivores find them out. One recently dead bird with a spur-thrust through its breast I found with a circle of gorged leeches lying about, and the ants were assembling in hundreds, eager to play their part in the drama of dissolution.

Even continued trapping will not drive these birds away, and a pot-hunter or trapper could destroy every member of a flock.

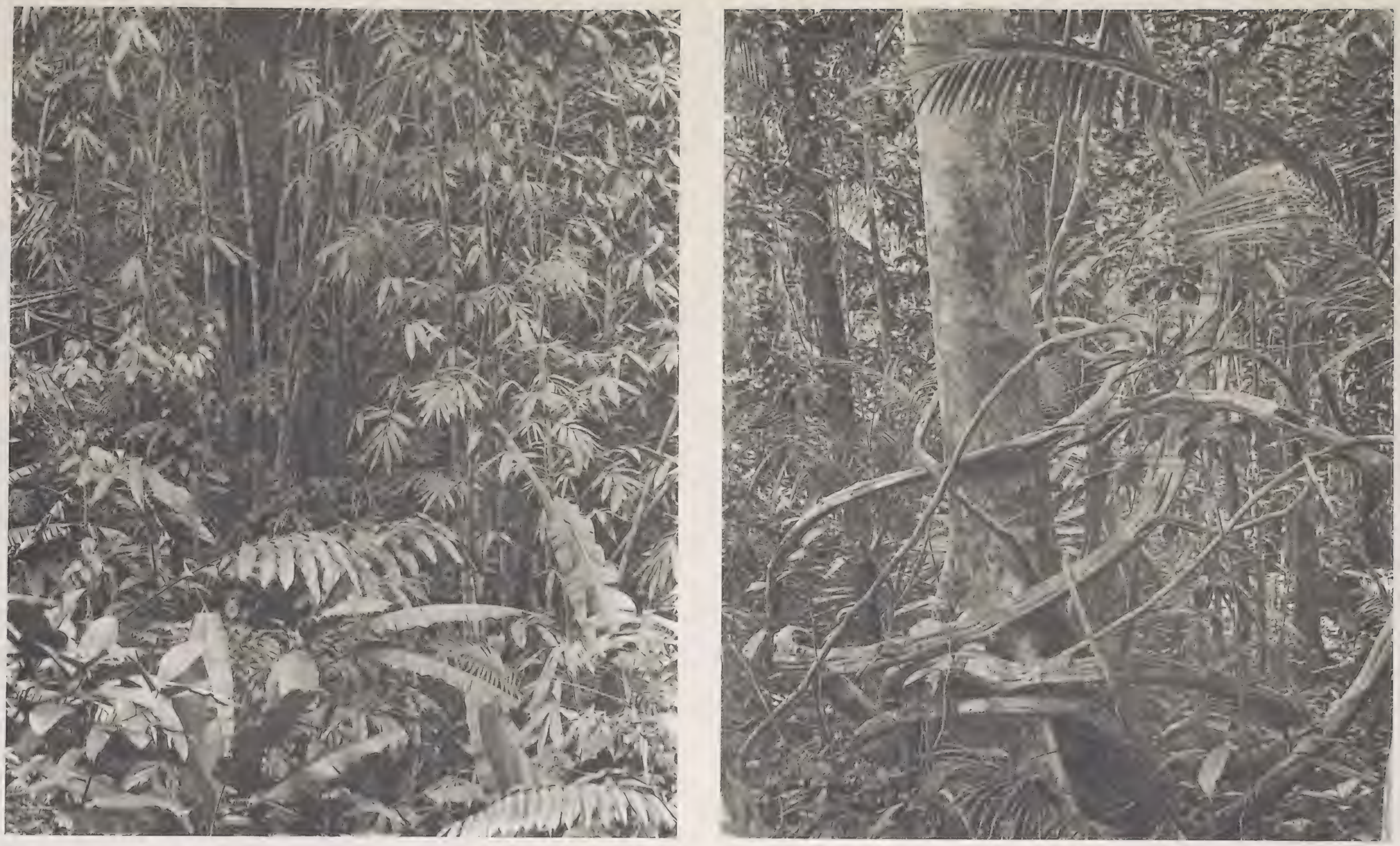
The note of suspicion or half-alarm of the Malayan Fireback is a sharp, explosive *kak!* followed by the throaty, frog-like gulp, characteristic of all the *Gennaeus*, uttered once or twice. Then the *kak!* again, and the subdued bubbling or gurgling sounds. The note of wild despair when attacked by some animal, or being removed from a trap by a native, is, in the old bird, a hoarse, long-drawn cry; in the young a shrill whistling. The sound of warning or challenge when two cocks threaten one another is a deep, hoarse drawl, almost a snarl, which one would attribute rather to a carnivore than to a small pheasant.

The fowl-like appearance which the roof-like, compressed tail gives to this Fireback is well indicated by the Malayan name. The natives never call it *kuang* (pheasant), but always *burong* (bird) or *ayam* (fowl).

Although this pheasant is not uncommon in some places, and, as we have seen, even frequents the vicinity of isolated huts or native hamlets, yet its nest has never been found, nor, as far as I know, have we any record of its eggs or young. I was unable to learn anything authentic concerning its nidification, although the natives were ever ready to furnish me with any information (doubtless made to order) which they thought

HAUNTS OF THE MALAYAN AND BORNEAN CRESTLESS FIREBACKS

In both countries these pheasants live in dense jungle, where they have access to open clearings, or at least the trails made by wild animals. Here they strive to escape their enemies, snakes and civet cats, which lie in wait or creep silently through the undergrowth. And here they nest, although up to the present time no white man has seen nest, eggs or young, so timid are they, and so skilful in hiding their home among the swamps and tangles.



HAUNTS OF THE MALAYAN AND THE BORNEAN CRESTLESS FIREBACKS

would please me. To test the elasticity of such facts I led a Malay headman to assure me one day that the *burong mêrah mata* laid but two eggs and in a tree! while on the following day, when I expressed disappointment that they deposited so few, he informed me in a burst of confidence that many of the hens laid five times that number! A female which I shot well to the southward was about to deposit an egg, while two others were well developed. The shell was plain buffy-white in colour, with very minute pits.

The birds spend the night well up in trees, and when a native discovers such a roosting-place he is well-nigh certain of capturing the birds, as he will set scores of nooses in all the grassy runways leading to the tree, and the habit of returning night after night to the same place ensures their capture. They seem to feed at all times of the day, not only early in the morning and in the evening, as with most pheasants. In the game and buffalo trails they scratch like fowls, making a great noise and rustling of leaves. At such times, however, unlike the Himalayan pheasants, they seldom utter a sound, and every moment or two stand erect, motionless and silent, watching, listening, for the dangers which threaten every inmate of the jungle. It is said that the females are more numerous than the males, but this I cannot confirm. The sexes have been approximately equal in the covies or flocks which have come under my observation.

The food which I have examined in the crops of the birds consists of animal and vegetable matter in about equal proportions. Termites, as usual, are very frequently eaten, ticks and grubs less often. Small hard berries, with but a thin skin over the very large stone, formed the food of two male birds; poor sustenance, one would think.

They seem to be stupid birds, and I have never seen one in captivity which showed any relaxation of the shyness or unreasoning wildness of a feral bird. Those which I sent to America were the only ones of their genus to reach that country. In Europe they are better known, and some eighteen or twenty individuals have been received at the London Zoo. These, on an average, have lived about a year and eight months, although one bird remained in the collection for more than nine years.

DETAILED DESCRIPTION

ADULT MALE.—Forehead, crown, chin, throat and ear-coverts (the only cephalic feathered areas) dull dark brown, the feathers of the occiput often tipped with chestnut or with a slight whitish freckling. Neck and breast black, glossed with purplish blue. Mantle, upper back and scapulars similar, but freckled or irregularly banded with wavy bars of white; the gloss dies out gradually on the wing-coverts and secondaries, but the freckled barring persists strongly; the primaries are plain, dark brown. Visible area of lower back, consisting of a wide, terminal, disintegrated fringe, fiery bronze-gold, basally each feather changing abruptly into a narrow bronze-red and then to a white-freckled, steel-blue zone. Posteriorly the gold decreases rather suddenly and the bronze-red takes its place, the basal freckling disappearing at the same time, leaving the clear steel-blue. The deep metallic red or maroon persists strongly up to the longest upper tail-coverts, which are wholly dull steel-blue. The tail is uniform pale rufous-buff, with the basal part of the feathers black. The sides of the body, flanks, and under tail-coverts are heavily glossed with blue, and the former show slight traces of the white freckling. The mid-ventral plumage is mostly dull blackish.

Irides hazel-brown; facial skin vermilion; nape wattle is sometimes fairly well developed, and in a breeding male the facial shield of skin stands up ridge-like above the crown feathers; mandibles pale horn, blackish toward base; legs and feet bluish grey. The single pair of spurs are long, stout and curved, and average 25 mm. in length. Measurements are, bill from nostril, 17; wing, 245; tail, 162; tarsus, 79; middle toe and claw, 51 mm.

VARIATIONS OF PLUMAGE

Adult Male.—About fifty per cent. of adult *erythrophthalmus* males have the shafts of the ventral plumage, especially on the breast, conspicuously white, thus approximating the very specialized corresponding feathers of the Bornean *pyronotus*.

As regards the status of *Acomus inornatus*. In 1879 Salvadori described a bird from Mount Singalan, on the west coast of Sumatra, as a new species of Crestless Fireback. Since then a second similar specimen has been obtained. Both are said on good evidence to be males, and yet curiously enough are almost identical in colour with the females of the two other species of *Acomus*, the chief point of distinction being the scaly appearance of the dorsal surface, owing to the steel-blue colour being confined chiefly to the distal fringe of the feathers.

Upon examination of many scores of specimens of *erythrophthalmus* collected by myself and in various museums, I find so much variation to exist that I cannot bring myself to accept *inornatus* even as a sub-species. Both Johore and Sumatran specimens show all gradations between complete gloss and a narrow terminal fringe, and as to the freckling and iridescent back and rump I have two black-tailed males trapped in the same line of nooses in north Johore with four perfectly normal males, which show only the barest trace of white, while the dorsal colour is absent from one and extremely imperfect in the other. In fact, when skinning the first I sexed the bird merely as a matter of habit and was most surprised to find that the individual was a male, with full-developed generative organs, and yet in the plumage of a female. I can offer as explanation only that this most interesting phenomenon is doubtless correlated with the very unusual approximation of colour in the sexes of this genus, a character so unlike their nearest relatives—the crested firebacks (*Lophura*). The close association of the two phases, and their occurrence in both the Malay Peninsula and Sumatra would seem to indicate that its occurrence is no more than a variation such as the so-called *Lophophorus chambanus* in a wild state, or *Chrysolophus obscurus* or *Pavo nigripennis* in captive birds.

Adult Female.—Forehead, crown and occiput dark brown, chin, throat and ear-coverts paler, smoky grey. Upper plumage black, strongly glossed with steel-blue on the exposed portions of the feathers. The gloss dies out on the secondaries and tail-feathers, which are black, the primaries being brown. The under-parts show very little gloss, this being confined to the breast, sides and under tail-coverts, the remainder being dull, brownish black. Many females show a small round white spot or mottled patch on the feathers of the crown and side of the nape. Correlated with the other masculine characters, such as colour in general and extent of bare facial area, the spurs are well developed in this sex. They differ from those of the male, however, in being almost or quite straight, and average 9 mm. in length. The well-developed, carunculated facial area is blood red; eyes hazel, legs and feet blue-grey. Measurements are, bill from nostril, 16; wing, 221; tail, 142; tarsus, 71; middle toe and claw, 46 mm.

JUVENILE PLUMAGE.—The general colouring of this age recalls the corresponding plumage of *Lophura*, and indeed of the females of that genus; black and varying shades of chestnut and rufous, the latter colour being confined more or less to the terminal parts of the feathers in the form of mottling or bands. In the succeeding moult this is eliminated from the plumage, except on the back and rump of the male, where it increases in area and assumes the fiery iridescence of those regions. The chin and upper throat are pure white, and the face is thinly feathered, and dull pinkish in hue.

FIRST YEAR MALE.—The species attains the general adult colouring at the first annual moult, but just as the breeding season varies so widely in various localities, so the condition of the bird at this moult shows unusual variation. In a typical male bird of four or five months of age the spurs are already 7 mm. in length. The papillæ on the bare facial area are scarcely apparent, being represented by rectangular scales or flattened nodules. There is a scanty growth of very short, minute, but perfectly formed black feathers over this area. On the body plumage as a whole there is considerably less steel-blue gloss than in the adult, the under-parts being almost wholly plain dull brown. The outer primaries are delayed, and show considerable buff mottling along the margins. The feathers of the back are very impure in colour, much mottled with black, and the fiery hue is almost absent, rather a dark chestnut or maroon. The rump is still darker. Of especial interest is the abundant white freckling on the breast, and the unusually white shafts of the ventral plumage, although even at this age this character is exceedingly variable. The tail moult produces extremes in colour and pattern, from a first-year set of rectrices which are almost wholly black, to the clear, pale buff of the adult. Almost invariably, however, the two central pairs, coming in later than the others, show a closer approximation to the specialized colouring of the adult. The young of this undergrowth-haunting bird seems to suffer the loss of many wing and tail feathers, so that we find them in all stages of half-growth. At this moult the measurements average, bill from nostril, 16; wing, 227; tail, 145; tarsus, 79; middle toe and claw, 50 mm.

EARLY HISTORY

Sir Thomas Raffles described a collection of animals and birds from Sumatra made through the East India Company, and read the paper before the Linnæan Society of London, December 5, 1820. This was the first authoritative description of this species. Subsequently many new generic and specific names were founded on misconceptions of the status of male and female birds, and disregard of previous appellations.

SYNONYMY

Phasianus erythrophthalmus Raffles, Tr. Linn. Soc., XIII. 1822, p. 321 [Sumatra].

Rufous-tailed Pheasant Latham, Gen. Hist., VIII. 1823, p. 204.

Houppifer diardii Guérin-Méneville, Icon. Reg. Anim. 1828–38, Ois., p. 26, pl. 43, fig. 2 [Java].

Houppifer erythrophthalmus Hartert, Nov. Zool., IX. 1902, p. 537 [Pahang].

Phasianus erythrophthalmus Gray, in Griff. ed. Cuv., III. 1829, p. 28.

Phasianus purpureus Gray, Ill., Ind. Zool., I. 1830–32, pl. 42.

Alectrophasis erythrophthalmus Gray, List Gen. B. 1841, p. 78; id. List of B., Part III., Gall. 1844, p. 26; Hume, Str. F., VIII. 1879, p. 68 [Malacca]; Kelham, Ibis 1881, p. 531 [Perak].

Alectrophasis purpureus Gray, List Gen. B. 1841, p. 78.

Gallophasis erythrophthalmos Gray, Gen. B., III. 1845, p. 498.

Gallophasis purpureus Gray, Gen. B., III. 1845, p. 498.

Euplocomus erythrophthalmos Blyth, Cat. Mus. As. Soc. 1849, p. 245.

Euplocamus erythrophthalmus Sclater & Wolf, Zool. Sket. 2, 1861, pl. 34; Sclater, List of Phas. 1863, p. 7, pl. 8; Sclater, List Animals London Zoo, 1883, p. 484; Mitchell, Proc. Zool. Soc. 1911, p. 522.

Euplocamus erythrophthalmos Gray, List Gallinae Brit. Mus. 1867, p. 35; id. Hand-l. B., II. 1870, p. 259.

Euplocamus purpureus Gray, List Gallinae Brit. Mus. 1867, p. 36; id. Hand-l. B., II. 1870, p. 259.

Euplocomus erythrophthalmus Elliot, Mon. Phas., II. 1872, pl. 28.

Acomus inornatus Salvad. Ann. Mus. Civ. Genov., XIV. 1879, p. 250; id. P.Z.S. 1879, p. 651, pl. XLVIII [Mount Singalan, west coast of Sumatra]; Büttikofer, N. Leyd. Mus., IX. 1887, p. 77 [Padang, W. Sumatra]; Grant, Cat. Birds Brit. Mus., XXII. 1893, p. 285; Grant, Hand-book Game-birds, I. 1895, p. 242.

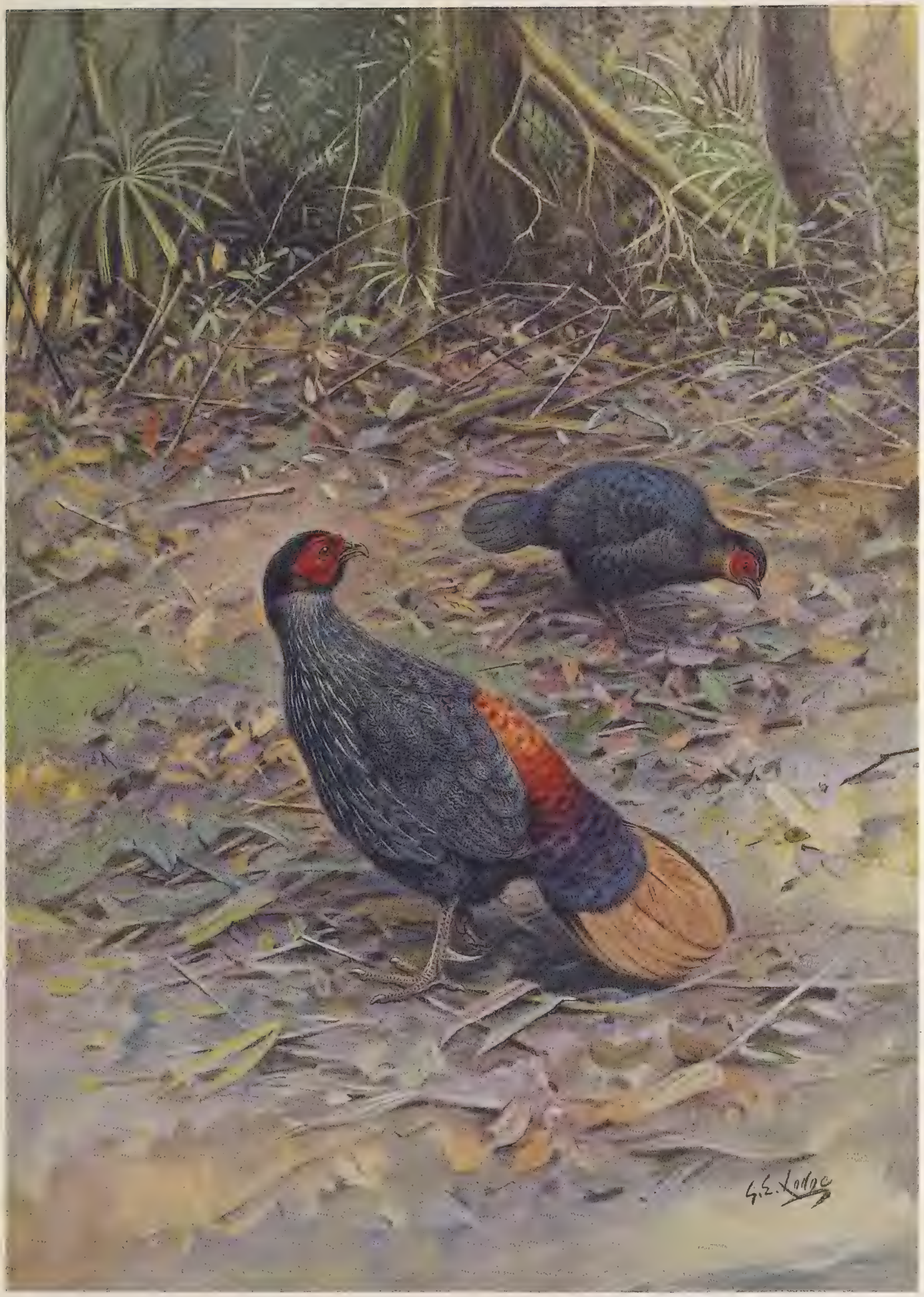
Acomus erythrophthalmus Grant, Cat. Birds Brit. Mus., XXII. 1893, p. 283; Grant, Hand-book Game-birds, I. 1895, p. 241; Sharpe, Hand-list Genera and Species Birds, I. 1899, p. 34; Robinson, Jour. Fed. Malay States Museums, I. 1906, No. 4, p. 128.

BORNEAN CRESTLESS FIREBACK

Acomus pyronotus (Gray)

Low, wet jungle along the coast of Borneo is the home of this bird. I have seen a pair feeding beneath a berry tree, upon the fallen fruit, together with the insects which have collected. A small bird called out in alarm at the sight of some danger, and both birds squatted flat among the begonias. A scale-bird sang, and confidence was at once restored. A few minutes later a great branch crashed to the ground, but the birds hardly glanced up, so perfectly did they judge between actual danger and a harmless jungle happening.

PLATE XXXIV.



BORNEAN CRESTLESS FIREBACK.

BORNEAN CRESTLESS FIREBACK

Acomus pyronotus (Gray)

Names.—Specific: *pyronotus*, from Greek πῦρ, fire, and νῶτος, back. English: Bornean Crestless Fireback; Bornean Rufous-tailed Pheasant. Native: Singgier.

Brief Description.—Male: Head brown, upper neck grey; lower neck and mantle grey, breast black, all with white shafts; lower back golden, changing posteriorly into bronze red, and on the tail-coverts into purple. Posterior under plumage black, tail buff. Female: Head brown; entire plumage black, heavily glossed on dorsal surface with steel-blue.

Range.—Sarawak, Borneo.

DISTRIBUTION

The type specimens of this Fireback are labelled "China," but we now know that it is confined to the Island of Borneo, and very probably to the north-western portion, included in the boundaries of Sarawak. Even in this limited area the bird is the rarest of all the pheasants, and I could learn nothing of it in the interior. Along the coastal zone, within twenty or thirty miles of salt water, where there is solid ground, this bird may be looked for.

GENERAL ACCOUNT

The low-lying jungle in Sarawak is the home of the Bornean Crestless Fireback. The ground for the most part is damp and soggy, and covered thickly with a carpet of large and small dead leaves in all stages of decay. In every depression water stands, and every leaf holds at its point a diamond pendant, which drops at longer or shorter intervals. Even with the most careful stalking and patient watching it is most difficult to ferret out the life secrets of these wary Firebacks, but first let us see amid what scenes, what vegetation and animal life they make their home. The pheasant people of whom we are writing are altogether ground hunters, except at night, when they roost among the branches of some densely foliaged tree. So we will leave the detailed examination of the ground until later, and concern ourselves now with the mid and upper jungle.

Vines, saplings, and sprouting palms struggle fiercely for light and air, and always the vine is the victor, climbing to health and strength on its opponent's trunk and branches. The trunks are decorated with beautiful scarlet and white lichens, and creeping vines clutch the bark in their upward course like enormous vegetable millipedes. Thorns and briers are everywhere; the terrible spiny palm with its rows upon rows of bristling *chevaux-de-frise*, and innocent-looking vines which, cat-like, sheathe their claws in thick down. The most insidious is a climbing rotan palm, which sends up its graceful fronds high in air among the trunks, then from the tips, yards away, drops a wire-like strand to the ground, covered throughout with the sharpest of tooth-like thorns. This is weighted with scores of small orange globes, the fruit, and when one runs against the stem, one must never pull and lose one's temper, but carefully disentangle the ingenious trap.

Face-high are myriads of young plants, all shooting up manfully, hoping ever for the death and fall of one of the giants high overhead—their only hope for continued life. No two trunks are alike. One has many deep depressions in which water lodges, and affords a home for hosts of creatures—tree-toads lay their eggs therein, little water-striders circle about; each is a tiny ocean with its shallows and its depths, its everlasting game of life and death. Other trunks are clothed with leaves of creeping, clinging vines, some dark, lustrous, and covered with a thick mat of long hair, others shiny, wax-like.

Hardly a leaf in the whole jungle is perfect. Some are covered with a beautiful tracery of fungi; on other plants a score of leaves may present similar patterns of holes or scallops, showing where some insect had attacked them while yet in the enveloping bud.

The jungle growth brings death to our notice much more often than life. True, the new shoots are here, there, everywhere; but they grow quietly, and their drooping leaves are not conspicuous. But on every shrub, or vine, or tree, hang dead or dying leaves. Thousands are barely attached, ready at the next breath of air to fall. The commonest sound in the jungle—either in a wind or in a dead calm—is the flick, flick, of falling leaves, the sharper crack and thud of fruit or twigs, and now and then the long-drawn-out crash of a tree itself.

Small need have the denizens of the jungle to adopt protective colouring, at least from our eyes. For every conceivable pattern—brilliant or dull—on scale, or fur or feather, there are a score to match it or go one better among the living and dead vegetation. A kallima butterfly flits by, the very embodiment of a dead and withered leaf. Sometimes it alights in orthodox kallima fashion on the stem of a twig, again on a trunk, again on the surface of some great dead leaf. This one never alighted on a green leaf, at least in the twenty or twenty-five times I watched it. But our eyes are not those of keen, hungry, flycatching reptiles, birds, or beasts, so who are we to say this wonderful colouring is not useful to the uttermost?

If we are near some berry or fruit tree, we will never be out of the sound of birds' voices. Usually it is a flock of beautiful green fruit pigeons, which slap their wings noisily, and almost always a few of the brown-eared chat-thrushes or scale-birds. Their call-note is sweet and tender as that of a bluebird; their note of alarm is the same, with an element of harshness predominating. Suddenly every bird in the berry tree may scream out in dire fear, and with a swish and rush a hawk will fall from the blue sky to the topmost branches—successful or not, we cannot see.

At such a time I have watched a pair of Crestless Firebacks feeding beneath a berry tree, upon the fallen fruit, together with the insects which have collected. At the sound of general alarm from the tree-tops, both birds squatted flat among the begonias, and with hardly a wink of the eyelids remained motionless until the upper jungle was again vocal with subdued chirps and calls. A scale-bird sang, and confidence was at once restored. Hardly had they begun anew their search for food when a good-sized branch crashed to the ground close at hand. It was a sudden, loud, startling sound to my ears, but beyond a quick glance the pheasants paid no attention to it; such a sound was to them a harmless jungle theme, holding no chord of tragedy.

While the pair of Firebacks kept close together, they apparently had no great affection for one another, and not only occasionally pecked peevishly at each other, but twice backed away and made half-hearted cuts with their spurs.

In the jungle we are certain, sooner or later, to hear a loud *woof! woof! woof! woof!* and a great black hornbull rushes over. It alights a little distance away, and we hear the most amazing outcry of complaining creaks and rasping whines. It is, perhaps, Madame H. in her mud-guarded hollow tree, scolding her husband for a belated *déjeuner* of berries!

A few subdued crashes announce other actors, and a troop of gibbons swings up. Their method of progress is the very poetry of monkey travel, hand over hand, each swing furnishing momentum for the next. Then a sudden stop, and a long thin arm or leg reaches out and draws in some fruit or berry. A round dark face peers down, a mother slaps her whining baby clinging to her fur, and the troop is off, almost noiselessly, except when one lands with a crash after a leap of twenty feet from one tree to another.

Then a great zebra civet passes close to us with squirrel-like leaps and sudden rushes. As one sits quietly, birds pass or alight near by every minute or two. In an island as large as Borneo, which contains no fewer than five hundred and fifty-five species of birds, the variety which is seen day after day is bewildering. One can never be sure what will be the next to appear. A certain species may alight close by, fly off and never be seen again. Others may be observed frequently in many different places.

I have spent a week searching unceasingly for Crestless Firebacks and neither heard a note nor seen a feather. I have squatted in a most unlikely spot, with my back against the great buttressed base of a mighty tree, and had two females come into view almost at once and remain for ten minutes. Not only this, but on the following day these same birds were in the same place at the corresponding hour. Such perversity of fate or luck governs the observation of rare pheasants!

The natives trap these birds whenever possible, but only once have I seen their feathers in head-dresses, and it was seldom that a Dyak could recognize a picture of one, while the delineation of a crested fireback, argus, or white-tail wrought him to a high pitch of enthusiasm at once. Their nest, eggs, and young still remain a mystery. Unlike their Malayan brethren, I never found them near the Dyaks' communal homes, but merely by accident in the depth of the jungle.

DETAILED DESCRIPTION

Adult Male.—Crown very dark brown, sometimes with whitish shafts; chin and throat paler brown. A small patch of bright steel-blue on the nape. Neck blue-grey all around, paler on the sides and beneath, where the shafts are shining white. Mantle black, very finely vermiculated with bluish-grey, with shining white shafts. Back and wings glossy steel-blue, more sparsely vermiculated, the markings becoming more or less concentric grey lines on the larger coverts and outer webs of the secondaries. Primaries plain dull brown.

Lower back iridescent golden bronze. Posteriorly this changes suddenly into rich dark shining maroon, and this almost at once into the dark steel-blue of the remaining rump and the coverts. Tail pale buff, with the basal half black. On the outer feathers the buff is sometimes confined, even on old birds, to a small terminal patch on the outer web.

The remaining under-parts slightly glossed with dark steel-blue, and all under tail-coverts plain steel-blue; lower belly dull brown, with enlarged flattened shafts of most conspicuous shining white. The shape of the breast feathers is wholly unlike that in *erythrophthalmus*, being rounded in the latter, but pointed in *pyronotus*, with the shafts very unlike. In *erythrophthalmus* the rhachis is dark and normal in shape, tapering, and splitting up as usual into terminal barbs. In the Bornean bird the rhachis for the terminal third is expanded and flattened, and of a shining ivory white. In its enlarged condition it extends clear beyond the terminal barbs as a strong white spine.

Bill yellow, black at base, scarlet facial skin covered with finger-like papillæ and a sparse scattering of hair-like, degenerate, simple featherlets.

The spurs are curved, and from 15 to 33 mm. in length. The measurements are: bill from nostril, 18; wing, 235; tail, 148; tarsus, 81; middle toe and claw, 51 mm.

Immature males have the lower back much darker, the golden is more tarnished, mixed with reddish.

ADULT FEMALE.—Crown dark brown. Chin, throat, ear-coverts and sides of neck paler, smoky brown. Nape, belly and flight-feathers dull brownish black. The remainder of the plumage black, glossed, especially strongly on the upper surface, with dark steel-blue.

Upper mandible dark, lower yellowish. Bare facial area scarlet. Iris dark brown. Spurs straight, 15 mm. in length. Bill from nostril, 15; wing, 220; tail, 135; tarsus, 76; middle toe and claw, 48 mm.

EARLY HISTORY

Temminck was the first naturalist to give this bird a name, but as he never published it, it counted for naught. J. E. Grey, in his "Illustrations of Indian Zoology," figured it, but gave it the same title as the Malayan bird, which by a printer's error reads *erythrothalmus*. In 1844, G. R. Gray called the species *pyronotus*, but gave no description of it, so it remained for Dr. Sclater nine years later to finally correlate the bird with its scientific name and description. Elliot says that a male bird was living in the London Zoological Gardens in 1870, but I can find no other record of it.

SYNONYMY

Euplocomus erythrothalmus (sic) Gray, (nec Raffles), Illust. Ind. Zool. II. 1834, pl. 38, fig. 1.

Alectrophasis pyronota Gray, List of B., pt. III. 1844, Gall. p. 26.

Gallophasis pyronotus Gray, Gen. B. III. 1845, p. 498.

Alectrophasis personatus Temm. MS., Bonap. C.R. XLII. 1856, p. 879.

Euplocamus pyronotus Sclater, P.Z.S. 1863, p. 120; id. List of Phas. 1863, p. 8; Gray, List Gallinae Brit. Mus. 1867, p. 36; Blyth, Ibis, 1870, p. 174; Elliot, P.Z.S. 1871, p. 138.

Euplocomus pyronotus Gray, Hand-list of Birds, II. 1870, p. 259; Elliot, Mon. Phas. II. 1872, pl. 29; Salvad. Ucc. Born. 1874, p. 307; Sharpe, Ibis, 1877, p. 23 (Bintulu); Blas, Verh. Ges. Wien, XXXIII. 1883, p. 68 (Lihong Bahaja); Everett, List B. Born. 1889, p. 199.

Acomus pyronotus Gray, Hand-list of Birds, II. 1870, p. 259.

Phasianus personatus Blyth, Ibis, 1870, p. 174.

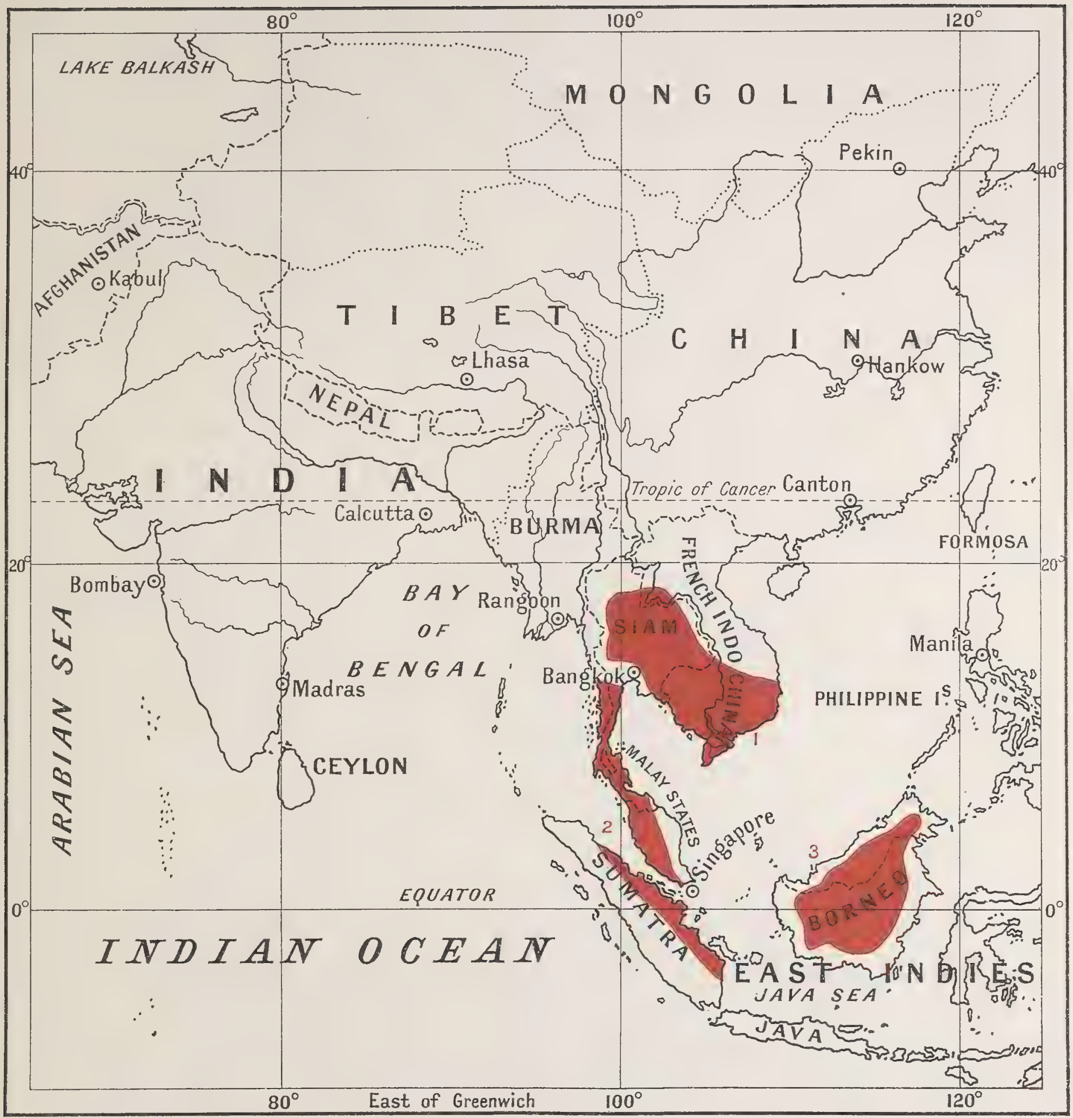
Euplocomus personatus Temm. MS., Elliot, Mon. Phas. II. 1872, text to pl. 29.

Acomus pyronotus Grant, Cat. Birds Brit. Mus. XXII. 1893, p. 284; Grant, Hand-book Game-birds, I. 1895, p. 242; Sharpe, Hand-list of Birds, I. 1899, p. 34.

LOPHURA

CRESTED FIREBACK PHEASANTS

MAP VIII.


80°
100°
120°
LAKE BALKASH
MONGOLIA
Pekin
40°
40°
AFGHANISTAN
Kabul
TIBET
CHINA
Lhasa
Hankow
NEPAL
INDIA
Tropic of Cancer
Canton
Calcutta
BURMA
FORMOSA
20°
20°
Bombay
BAY OF BENGAL
Rangoon
SIAM
FRENCH INDO CHINA
Manila
Bangkok
Madras
PHILIPPINE IS.
ARABIAN SEA
CEYLON
1
MALAY STATES
Singapore
2
3
BORNEO
SUMATRA
EQUATOR
0°
0°
INDIAN OCEAN
EAST INDIES
JAVA SEA
JAVA
80°
East of Greenwich
100°
120°

H.F.& G.Witherby, Publishers.
Stanford's Geograph! Estabt.

MAP SHOWING THE DISTRIBUTION OF THE CRESTED FIREBACK PHEASANTS.

Region 1. Lophura diardi
,, 2. ,, rufa.
,, 3. ,, ignita.

LOPHURA

CRESTED FIREBACK PHEASANTS

Family PHASIANIDAE

Subfamily PHASIANINAE

Genus *LOPHURA*

The Crested Firebacks have often been placed in the same genus with the silver pheasants, and indeed Swinhoe's pheasant bridges them rather closely, but the three species of *Lophura* are so well marked, and their resemblances *inter se* are so pronounced, that for convenience it seems much better to recognize them as a distinct genus. The males are characterized by the shining iridescent feathers of the lower back and rump, and by the elongated crest, the shafts bare at the base, the tips expanded into a brush of hair-like barbs. The crest is less developed or absent in the females.

The tail is quite long and composed of sixteen feathers, compressed laterally as in the crestless firebacks and junglefowls. The third pair of rectrices is slightly longer than the two central pairs and more than twice the length of the outer pair. The 5th and 6th primaries are slightly the longest, the 1st being shorter than the 2nd, which is equal to the 10th. A large bare area on the face may be red or blue, and a pair of gular wattles is more or less highly developed. The tarsus is nearly twice as long as the middle toe and claw. The males are armed with a pair of stout spurs, absent or very small in the females.

The term *Lophura* was proposed by Fleming in Philos. Zool. in the year 1822. None of the subsequent generic synonyms call for comment save *Diardigallus*. This was instituted by Bonaparte for the Siamese Fireback, and this bird has been considered sufficiently distinct by a number of authors to be placed in a genus of its own. Any decision in such an instance can only be made as logical as possible, reviewing the relative distinctions and resemblances, the relation and value of characters of the bird as a whole. The crest and fiery back seem in this case to outweigh the other colour and pattern differences, although *diardi* is certainly well worthy of pronounced sub-generic separation, if only on account of the rather unique female plumage.

LOPHURA

	Type.
Lophura Fleming, Philos. Zool. II. 1822, p. 230	*L. ignita.*
Euplocomus Temm. (nec Latr., Lep. 1809) Pl. Col. V. text to Lophophorus, 1830, p. 3	„
Macartneya Less., Traité d'Orn. 1831, p. 492	„
Spicifer Kaup, Das Thierreich, II. Theil I. 1836, p. 78	„
Lophalector Cab. in Ersch. u. Grub. Encycl. sec. 3, XXII. 1846, p. 146	„
Lophora Gray, Hand-list Birds, II. 1870, p. 259, No. 2378	„
Diardigallus Bonap. C. R. XLIII. 1856, p. 414	*L. diardi.*

The genus *Lophura*, as I limit it, includes three species, the most aberrant of which is *diardi*. The remaining two almost exactly parallel the two species of *Acomus* in distribution.

Siamese Crested Fireback	*Lophura diardi* (Temm.).
Malayan Crested Fireback	*Lophura rufa* (Raffl.).
Bornean Crested Fireback	*Lophura ignita* (Shaw and Nodd).

KEY TO *LOPHURA*

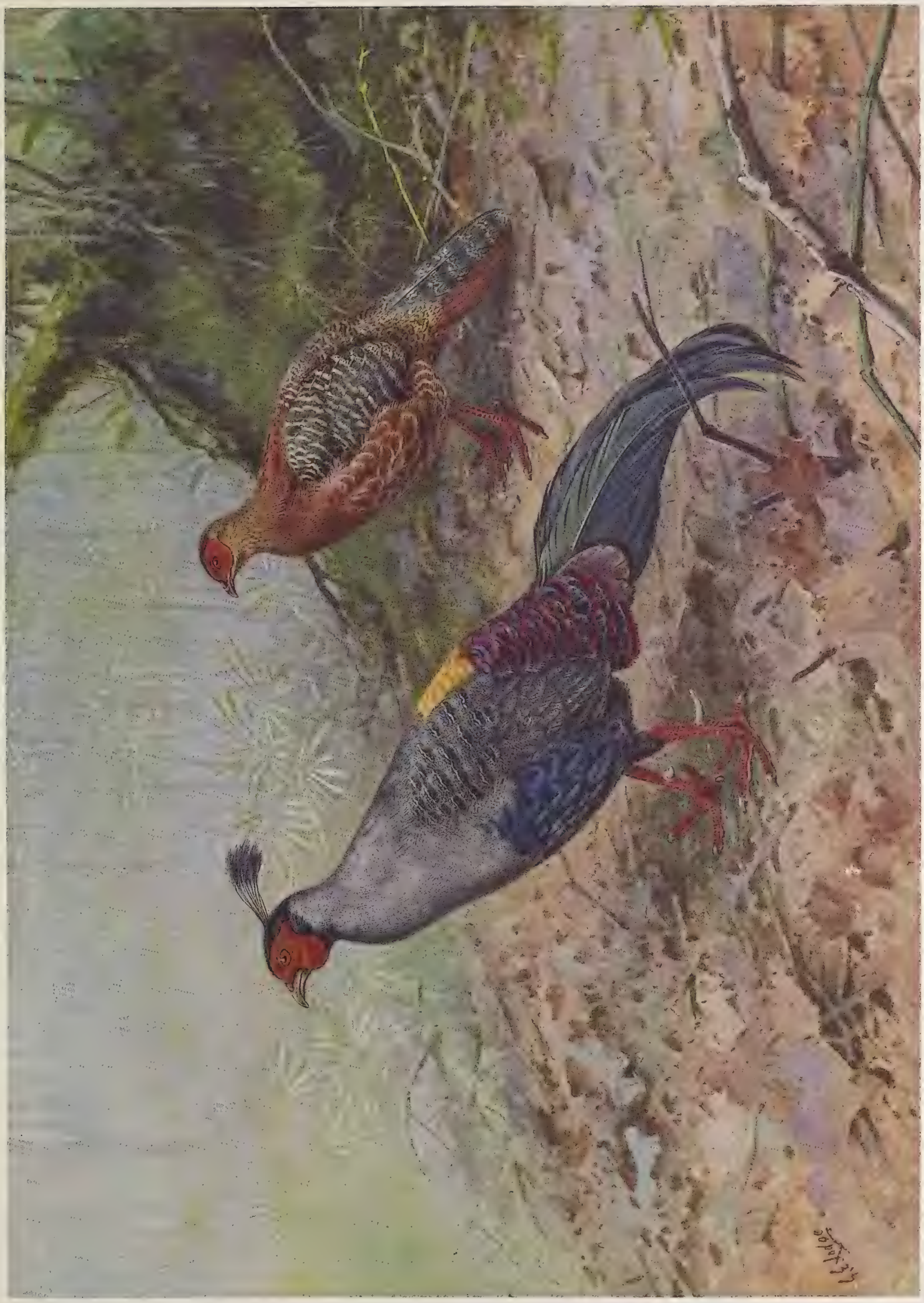
- I. Mantle not reddish-brown or chestnut (males).
  - a Breast grey . . . . *diardi.*
  - b Breast purplish-blue.
    - *a′* Belly black; central rectrices white . . . . *rufa.*
    - *b′*. Belly bronze-gold; central rectrices buff . . . . *ignita.*
- II. Mantle reddish-brown or chestnut (females).
  - c Wings black barred with buffy white . . . . *diardi.*
  - d Wings chestnut.
    - *c′* Outer rectrices chestnut . . . . *rufa.*
    - *d′* Outer rectrices black . . . . *ignita.*

SIAMESE CRESTED FIREBACK

Lophura diardi (Temminck)

Sportsmen in Siam who sit up on the look-out for tigers, sometimes see this magnificent bird step out from the jungle and walk slowly past, its fiery golden back flashing even in moonlight. It lives in dense bamboo thickets, and comes into more open jungle, often near the banks of a river, to feed and drink. It is as easy to trap as it is difficult to observe, and the Siamese bring many to the Bangkok market.

PLATE XXXV.



SIAMESE CRESTED FIREBACK.

SIAMESE CRESTED FIREBACK

Lophura diardi (Temminck)

Names.—Generic: *Lophura*; from the Greek *λόρουζος*, bushy or crested tail; Specific: *diardi*, named for the French explorer, M. Diard; English: Siamese or Diard's Fireback Pheasant; French: Faisan Prelat; German: Praelat; Native: Kai-pha.

Brief Description.—Male: Head and throat black, long tufted crest steel-blue; neck, mantle, breast and wings grey, finely vermiculated with black; wing-coverts with a black, white-edged band near the tips; mid-back shining gold; lower back and rump bronze-red; under-parts and tail black, with steel-blue gloss; face scarlet. Female: Head and neck brown; mantle, lateral tail-feathers and under-parts chestnut, the lower breast and belly margined with white; scapulars, wings, central tail-feathers, lower back and rump black, the two latter areas mottled, the others banded with whitish. Face scarlet.

Range.—Southern Shan States, Siam, Cambodia and Cochin China.

GENERAL ACCOUNT

With its striking contrasts of colour—shining gold and bronze-red—set off by cold grey, together with the long, curved tail-feathers and waving, plumed crest, the Siamese Fireback is one of the handsomest of pheasants. Many are trapped by the Siamese and brought down to the capital, Bangkok, whence they find their way to many of the Zoological Gardens and private aviaries of the world. Yet the most recent volume treating of the pheasants of the Far East begins and ends with the statement that "Nothing is known of the habits of this splendid Fireback!"

I was not able to observe it in its home, and can rely only on the meagre information which I obtained from residents, whose chief knowledge of the bird was that it was almost impossible to see and shoot, but when procured was a superb addition to the daily "chow"!

Bamboo thickets appear to be its favourite haunt, as two of my correspondents give this as a reason for the impossibility of following up a bird. It leaves these dense impenetrable tangles in the early morning and comes into more open jungle, preferably near the banks of rivers, to feed and drink. A sportsman who was accustomed to sit up in wait for tigers, more than once saw a pair of Diard's Firebacks come forth from the close-growing ranks of great bamboos and scratch about in the forest mould.

The natives report it as a stupid bird, and very easily trapped with simple hair or wire nooses set in runways, or about some food strewn upon the jungle debris. When a camp or more permanent building is erected in the forest, if the locality has been a favourite feeding-place of Firebacks, the birds do not desert at once, but after the first alarm has passed they return, and occasionally in early morning are seen near the clearing. This is especially true if cattle or buffalo are kept, the birds finding much insect food in the vicinity of these animals.

The Siamese Fireback has been hatched and reared several times in the gardens of the London Zoological Society, but apparently no record has been kept of either eggs or chicks. Of eight individuals which have lived in these gardens, the average length of life was three years and four months, while one reached the age of nine years and three months. An egg collected in Siam is bluish white, with a faint reddish shade, and measures 48 by 38 mm.

In captivity these birds soon become tame and familiar, and I have never seen a cock which would not soon come up to its keeper and take meal-worms from his fingers. At the same time they are very strong, and with their spurs are able to do great damage to other birds. If allowed to run freely with poultry they will engage every cock in combat, and no matter how skilful or strong a game-cock may be, it has no chance against this active Fireback of the Siamese wilderness. A writer in "The Field" tells us that even when the opponents of such a captive pheasant were double its weight they had no chance against it. He goes on to say that "At length its pugnacious propensities became such a nuisance that my neighbour's servants seized it one day and cut down its long, sharp spurs to mere stumps. The poor bird, however, though shorn of its strength, lost none of its spirit, and assailed its gallinaceous enemies as recklessly as ever. These soon found out that its weapons were gone, and plucking up courage, paid it off with interest for former injuries; in a week or two my *Diardigallus* had scarce a feather left on it." The same writer says, that when in good health, the Siamese Fireback incessantly uttered a sweet, mellow cooing and clucking.

DETAILED DESCRIPTION

ADULT MALE.—Feathered parts of the head, chin and throat black; crest of ten or more feathers, black glossed with steel-blue. These feathers are 85 mm. long, with thickened bare shafts for about two-thirds of the entire length, the extremity being formed of a long tuft or bunch of disintegrated barbs. The neck and the entire mantle and breast, together with the scapulars, wing-coverts and secondaries (these latter chiefly on the outer webs), show a beautiful even vermiculation of white and black, producing almost a monochrome grey. The scapulars, lesser and median wing-coverts show a black sub-terminal band, narrowly edged with white. Mid-back, shining gold on the broad, disintegrated terminal fringe which forms the visible portion of the feathers, then an equal area of pale buff, the remaining basal portion vermiculated grey like the mantle; lower back, rump and shorter tail-coverts with a terminal fringe of rich, dark, shining crimson, the remainder of the feathers being glossy steel-blue. Longest tail-coverts purplish-green with a rather narrow terminal fringe of clear, shining sage green. Primaries brownish-black, faintly mottled with grey. Belly, lower sides, flanks and under tail-coverts black, with a broad terminal fringe of steel-blue. Tail-feathers black, glossed with purplish-blue on the outer webs, greenish on the inner. The rectrices are strongly curved, the three inner pairs being remarkably long and pointed. Bill yellowish, darker toward the base; facial skin, wattles, legs and feet, scarlet; spurs and claws whitish horn colour. Bill from nostril, 18 mm.; wing, 233; tail, 322; tarsus, 101; middle toe and claw, 58; spur, 20.

ADULT FEMALE.—Top of the head and neck brown, shading into smoky grey on the chin and throat. Mantle clear, dull chestnut, posteriorly becoming more and more mottled with black, then changing rather abruptly into the pattern of the remaining upper parts. Mid-back black, coarsely barred with buffy white; lower back, rump and tail-coverts similar, but the barring disintegrates into a coarse mottling. Scapulars, wing-coverts and secondaries black, strikingly barred with white, the centre of the bars showing considerable black mottling. The exposed portions of the greater coverts and secondaries show much greenish gloss. On the primaries the bars become buffy or rufous-brown, and are much broken. Two central pairs of rectrices closely resemble the secondaries, but with the eight or more bars much diffused with mottling. Third pair of tail-feathers chestnut, with a great deal of black barring and mottling on the inner webs; the remaining rectrices and under tail-coverts clear chestnut. Entire ventral surface reddish-chestnut, the breast almost monochrome, but with a white marginal fringe appearing on the lower breast, and increasing in extent over the remaining posterior ventral plumage. Upper mandible dark, lower chiefly yellowish horn colour; irides hazel brown; facial skin, legs and feet scarlet; claws whitish horn. Spurs low, sharp scalules. Bill from nostril, 16 mm.; wing, 223; tail, 202; tarsus, 81; middle toe and claw, 46.

The female *diardi* is interesting as exhibiting the same differentiation of pattern in the tail as is shown by the males of *Acomus* and the other species of *Lophura*.

Juvenile Plumage.—Crown (lacking a crest), sides of head and back of neck dark, smoky brown, merging into the mantle, which is rufous, slightly mottled with dark. On the scapulars a black spot occurs, and on the mottled grey wing-coverts this increases until the pale buff colour is confined to the tip and to several narrow transverse bars. On the inner secondaries these become very distinct, each feather showing six or more straight, narrow cross-bars on a black field. The tail-feathers are chestnut, marked and barred with blackish. The ventral plumage is dull brown, faintly freckled with whitish. The specialized fiery back is only faintly indicated at this age: a slight golden fringe much freckled and dulled with black and white, while the bronze-red rump is barely suggested by a rather mottled chestnut fringe.

First Year Plumage.—The wing of the young male Fireback [Coloured Plate XXXVI, fig. 4], when in half-way transition between juvenile and first-year plumage, is exceedingly interesting. One such wing showed primaries Nos. 9 and 10 full grown, but with the sheath still clinging to their bases as plain evidence of their delayed growth. Primaries 1 to 6 inclusive were new, 1 to 3 full grown, while Nos. 4, 5 and 6 were new feathers in active growth, measuring respectively 149, 124, and 99 mm. out of their sheaths. Nos. 7 and 8 were still unshed.

It should be remembered that the wing-feathers of the adult male, both primaries and secondaries, show no complex patterning. The former are brownish-black faintly flecked with grey; the secondaries are all evenly and minutely vermiculated (chiefly on the outer webs) with white. Keeping this in mind, such a wing as that which we shall describe is most interesting and significant. The gradation of specialized pattern revealed by the delayed growth of the outermost primaries, together with the presence simultaneously of pure juvenile and typical adult feathers, gives us, upon the surface of the single wing, a review of all the ontological pattern changes through which the young bird passes as it gradually attains the adult state.

Primary No. 7 may be taken as typical of the real juvenile plumage. It is dark brown, with faint, wholly irregular mottling of dull rufous on the outer web.

Primary No. 8 (the third from the outer), which, as usual, was somewhat delayed in its appearance, has pale buff markings on both webs, in the form of bands oblique to the shaft, about nine altogether, wavy and mottled, but distinct. Nos. 9 and 10 very evidently appeared synchronously and are almost identical. The pale buff, mottled bands persist only on the inner part of the inner webs, while in place of the bands elsewhere is now a faint, diffuse cloudiness of pale blue-grey, which has spread until the interspaces have become reduced to roundish, dark brown spots, very regular and sharply delimited on the outer webs. There are six or seven on each web.

Passing inward to the newly growing feathers, in No. 6 we find a further development of this pattern. The vane in general is very dark brown, entirely, evenly and finely flecked with minute white dots, except for the terminal 38 mm., where are three pairs of markings, half broken oblique bars, half marginal ocelli.

On the succeeding inner primaries the white peppering or vermiculation is unbroken.

As usual in this stage of phasianine wing-moult, the outermost secondary (No. 1) is still unshed, although much worn and somewhat broken. It is brown, with pale buff cross-bars. The next seven secondaries are new, having been shed successively inward, the eighth being very short. The succeeding five are unshed, showing the typical juvenile, buff-banded pattern.

In a second immature male, with the wing-moult somewhat farther advanced, the long-delayed first or outermost secondary has been shed and the new feather is half grown. In colour it is adult, evenly freckled with bluish white, while the succeeding four secondaries all show distinct bands or ocelli on the outer webs. The sixth secondary is typically freckled. So the delayed outer secondary skips the pattern of the next four inner ones, its pattern being of the same adult type infused into the sixth and succeeding ones.

The moult of the primaries in this individual must have occurred rather earlier than usual, before all the juvenile pigment was eliminated from the blood, for the innermost, or No. 1, is quite buffy and banded, and indeed not until the fifth primary is reached do we find unadulterated, pure adult freckling.

The tail moult of these birds, proceeding regularly from the outside inward, is very readily followed by means of the radical change in colour and pattern; the juvenile rectrices being rich chestnut, banded with black, especially heavily on the inner webs, while the new feathers are jet black with a slight greenish gloss.

SUMMARY

The reason I have treated in such detail this transition from juvenile to adult plumage, is that it seems to indicate the suppression of a specialized plumage pattern which is visible only through the accident of delay in certain wing-feathers. The flight-feathers of the adult, both primaries and secondaries, show no complex pattern. The former are brown, faintly flecked with grey, the latter evenly vermiculated with white. The very distinct bars and ocelli shown by feathers of intermediate growth [see Coloured

PLUMAGES OF THE BORNEAN AND SIAMESE CRESTED FIREBACK

Lophura ignita and *Lophura diardi*

Fig. 1. Chick of Bornean Crested Fireback, *Lophura ignita.*

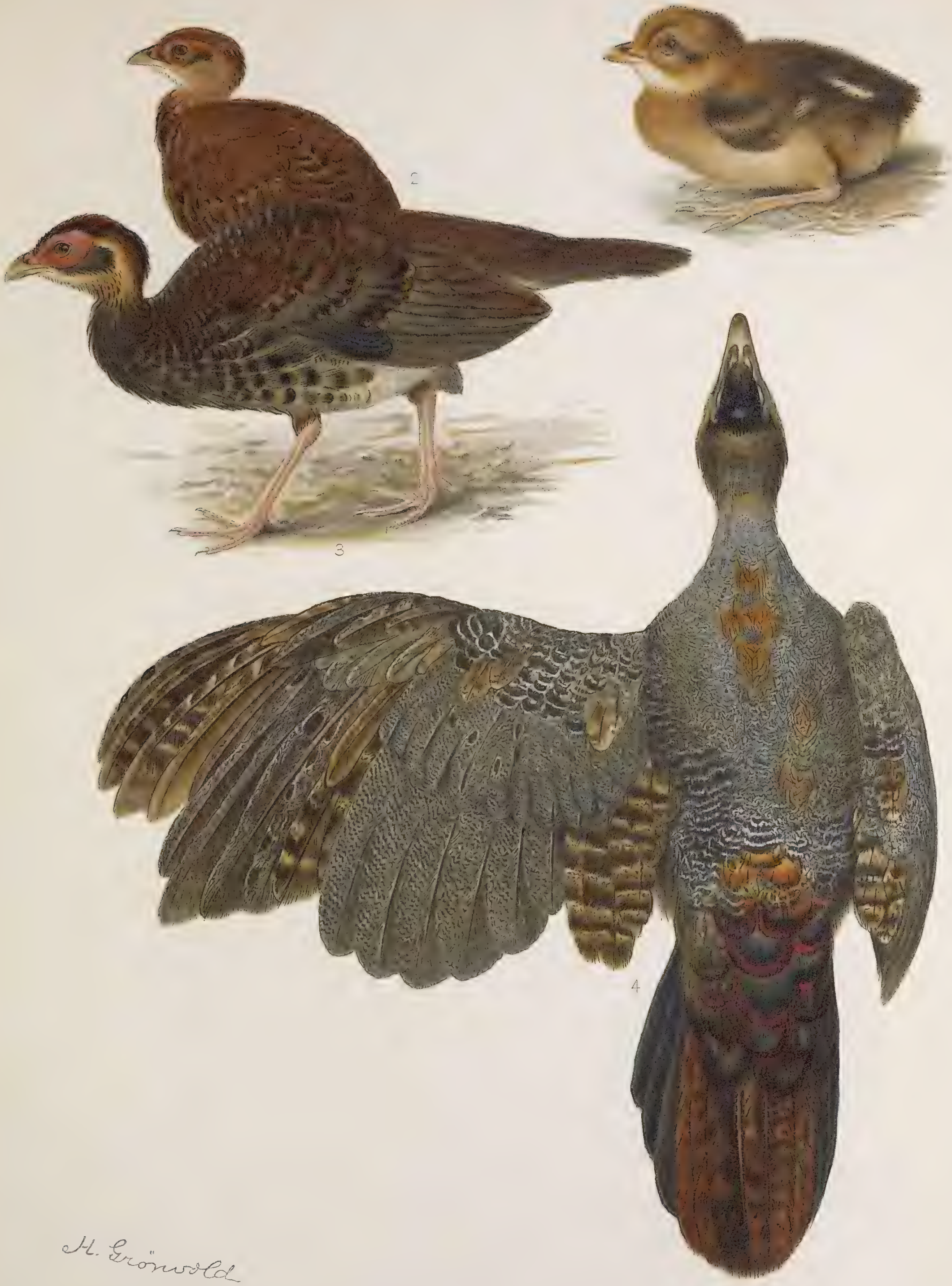
Figs. 2 and 3. Bornean Crested Fireback, *Lophura ignita.*

Juvenile plumage of the female (2), and male (3).

Fig. 4. Siamese Fireback, *Lophura diardi.*

Transition plumage between juvenile and first year, showing sequence and nodes of moults and the unusual pattern complexity of the immature wing-feathers.

PLATE XXXVI.



H. Grönvold

PLUMAGES OF THE BORNEAN & SIAMESE CRESTED FIREBACKS.

Plate XXXVI, fig. 4] are comparable neither with the buffy markings of the juvenile plumage nor the unbroken design of the adult pigmentation. The coverts, however, as we have seen, retain in the adult a terminal band of black. As far as I know, there is no specimen of the chick in down nor of early complete juvenile plumage extant in collections, and only two or three immature males in any museum.

EARLY HISTORY

When Gould, in 1860, published Vol. VII. of his "Birds of Asia," he was able to figure the male of this species from a specimen which Sir Robert Schomburgk, British Consul-General for Siam, procured alive from a small collection of animals kept at a Wat or Siamese temple. Gould added as the supposed female a figure drawn by Mr. Crawford from a bird obtained at Ava, Burma. This is undoubtedly a very poor representative of a young male or female of some form of *Gennaeus* hybrid. The elongated tail-feathers of the male are wrongly represented as turning outward like those of a black cock, instead of closely opposed and sweeping gracefully around and downward. Elliot's plate of the male bird, while correcting this error, is totally wrong as representing these feathers as short and but little curved. The female is recognizable, but has the neck pale buff, not chestnut, and much of the mantle barred instead of plain.

SYNONYMY

Euplocomus diardi Temm. MSS., Bonap. C. R., XLIII. 1856, p. 415; Gray, Hand-list of Birds, II. 1870, p. 260.

Diardigallus praelatus Bonap. C. R., XLIII. 1856, p. 415; Schl., Hand-l. Dierk, I., p. 379, Atlas Aves, 1857, pl. V. fig. 55; Gould, B. Asia, VII. 1860, pl. 21 [male only].

Gallus diardi Temm. MS., Schl., Hand-l. d. Dierk, I. 1857, p. 379, Atlas Aves, pl. V. fig. 55.

Diardigallus fasciolatus Blyth, Jour. As. Soc. B., XXVII. 1858, p. 280.

Diardigallus crawfurdi Schomb., Proc. Zool. Soc. 1862, p. 250.

Euplocamus crawfurdi Sclat., List of Phas. 1863, p. 6.

Euplocamus praelatus Sclat., List of Phas. 1863, p. 6, pl. 6 [Siam, Shan States]; Schomb., Ibis, 1864, p. 259 [E. Lao Country]; Sclat. & Wolf, Zool. Sket. 2, 1867, pl. 35; Gray, List Gallinae Brit. Mus. 1867, p. 34; Elliot, Mon. Phas., II. 1872, pl. 24; Mitchell, Proc. Zool. Soc. 1911, p. 522.

Lophura diardi Grant, Brit. Mus. Cat. Birds, XXII. 1893, p. 290; Grant, Hand-book Game-birds, I. 1895, p. 247; Nehrkorn, Kat. der Eiersammlung, 1899, p. 193; Gyldenstolpe, Kungl. Svensk, Hand-l., 50, No. 8, 1913, p. 67; Gyldenstolpe, Jour. Nat. Hist. Soc. Siam, I. 1915, p. 235; Baker, Jour. Bombay Nat. Hist. Soc. XXVI. p. 75 [desc. and habits].

Diardigallus diardi Sharpe, Hand-list of Birds, I. 1899, p. 35.

MALAYAN CRESTED FIREBACK

Lophura rufa (Raffles)

NAMES.—Specific: *rufa*, from the Latin *rufus*, red, with reference to the colour of the fiery back. English: Malayan Crested Fireback; Vieillot's Fireback. French: Faisan de Vieillot. German: Rothrückenfasan. Native: Pĕgar, or Ayam Pĕgar (Malay and Sakai); Ayam siul [Whistling fowl] (Malay).

BRIEF DESCRIPTION.—Male: General plumage black, glossed with purplish-blue; lower back and rump fiery bronze-red; feathers of the sides and flanks with white or chestnut shaft-stripes; middle pairs of tail-feathers white. A tufted crest with long bare shafts. Facial skin and wattles blue; feet red. Female: Rich chestnut above, faintly mottled with black; throat white; breast chestnut edged with white; remaining under plumage dark brown, widely margined with white. Crest shorter than in male. Facial skin blue; feet red.

RANGE.—From southern Siam and Tenasserim southward; Malay Peninsula and Sumatra.

GENERAL ACCOUNT

THIS is decidedly a low-country bird, and I doubt if it ever ascends to the higher altitudes of the Malayan or Sumatran mountains. In Siam I know of records only from the extreme south, and it is improbable that it overlaps the range of *diardi*. Even in the low Malayan coastal country of the west and the central Pahang region drained by the tributaries of the river of the same name, where I have observed this species, its distribution is far from regular. Great stretches which seem eminently suited to its requirements are apparently uninhabited by it, where the natives have no knowledge of the bird. Then again, not far distant, every child will recognize its picture and shout "*Ayam pêgar!*" and a few days of careful search will reveal traces of a family or flock. Nevertheless, in spite of its comparative abundance in some areas, my search for the Malayan Crested Fireback proved one of the most trying of my experiences with wild pheasants. By the calendar it was still the dry season; by the rain gauge it was the height of the rainy period. In the open forest where we expected to find this species we neither saw nor heard it.

Years ago, Malays or Sakais made numerous clearings throughout many parts of the jungle, planted some crop, and then deserted the clearing for another. Many of these were in valleys, close to the bed of small streams. Such places are now covered with a tangle of thorny palms and enmeshed vines, and in these all but impenetrable thickets, the beautiful Crested Fireback elects to spend most of his time. All trace of the former savage cultivator of the soil has vanished—hut, tools and pottery. But now and then, from the heart of some such tangle as I have described, a pair of house crows will fly up croaking hoarsely. Through all the years they or their descendants have clung to this bit of human handiwork, deep in the jungle and far from the haunts of living human beings. They form a parallel to the little Guiana house wrens which one finds still haunting old, long-deserted and overgrown huts in the heart of the British Guiana forest.[1]

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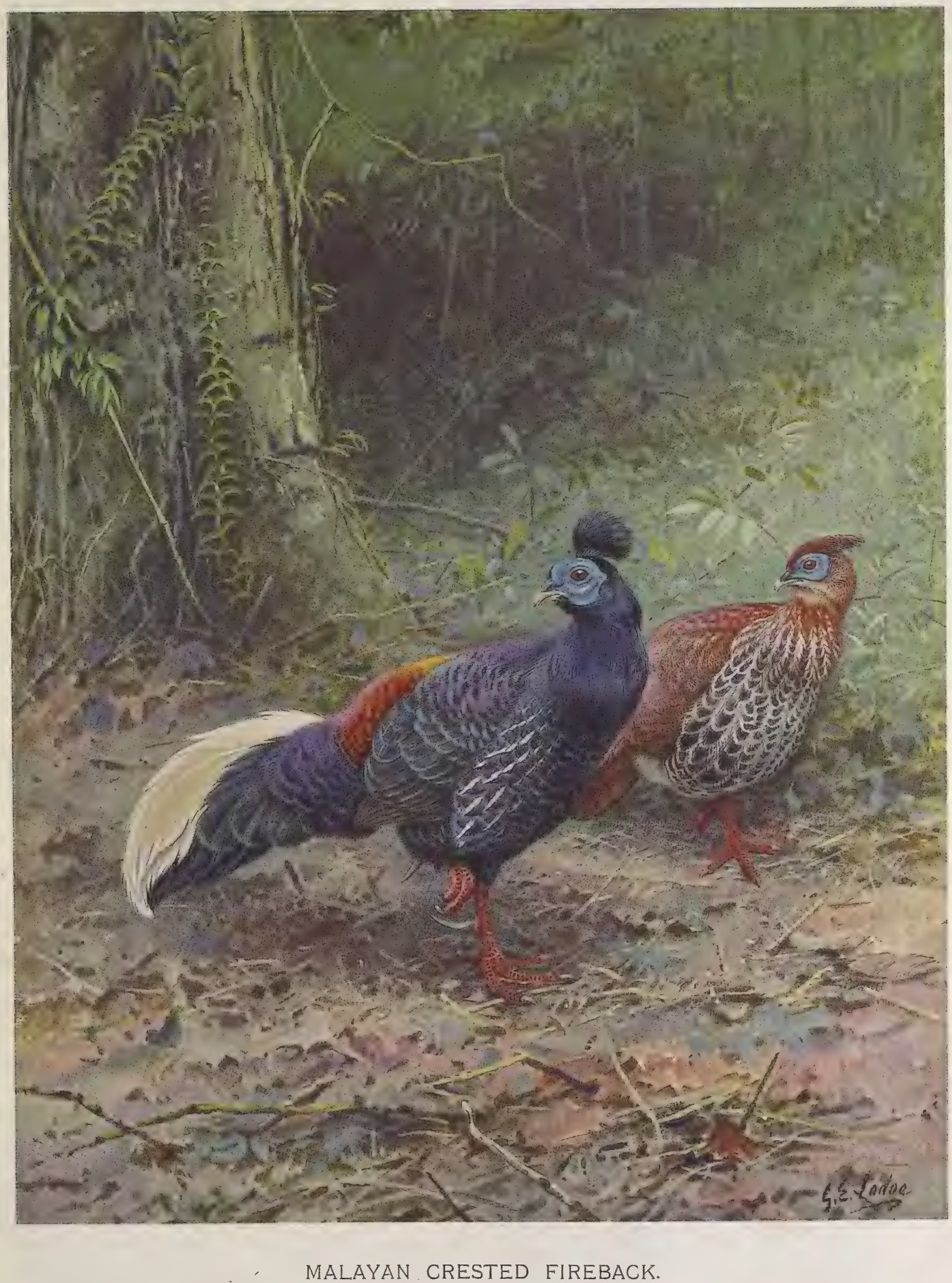
[1] Beebe, "Our Search for a Wilderness," 1910, p. 307.

MALAYAN CRESTED FIREBACK

Lophura rufa (Raffles)

A SINGLE glimpse of these birds after many hours of nerve-racking search is the usual reward. They are very shy and for ever on the alert for the slight crack or rustle of twig or leaf, but their beauty is worth the longest stalk and the most wearisome wait. They are found in pairs or in small families, and when alarmed go off with a headlong rush through the underbrush in preference to attempting flight.

PLATE XXXVII.



MALAYAN CRESTED FIREBACK.

One day's experience on a small unnamed tributary of the Pahang River, in the heart of that central Malayan State, is typical of many short trips which we made in search of this bird. The sun rises through the fogs which have drifted down from the mountains, and we find the air of early morning cool and invigorating. We follow a narrow game trail for a mile or more, and then turn aside into a creek bed. The moisture on the foliage soon drenches us, and we tramp through mud and water with as little noise as possible. In one likely spot we wait for an hour, but see nothing of the birds. We have heard one call far ahead of us and so keep on in hope. The sun seems to have leaped overhead and the whole jungle steams with heat. From now until we return we pant for breath, as if exercising in a hot-house or Turkish bath. Whenever we stop to listen, a myriad tiny gnats dance close before our eyes. Mosquitoes worry us on all sides—almost all Stegomyia, which we have roused from their resting-places on the leaves. One cannot but think what a terrible scourge to the natives of all this region yellow fever would be. Nothing could confine its ravages.

At last we reach one of the old over-grown clearings, and begin to cut our way carefully, foot by foot, pressing the cables of serried, recurved teeth to one side. When we can go no further we stop exhausted. Two or three species of bulbuls are singing close by and a pair of big racket-tailed drongos swoop back and forth overhead. It is impossible to sit quiet on account of the flies and mosquitoes. We clear a circle of leaves and sit back to back, flicking away the leeches which are ever humping over the ground toward us. An hour passes, and only the tracks in the mud near by and the begonias torn up by the powerful scratching of the birds, hint of their earlier presence.

Once, from a great distance, we hear the clear trumpet of an elephant and, shortly afterward, a cloud effaces the sun and a wind rustles the palm fronds. This increases to a gale, and instead of panting with still, humid heat we are shivering in the coolness. The birds have vanished, two long-tailed monkeys dash wildly from tree to tree, passing as swiftly as we could run.

Then comes the rain—sudden, windless, torrential. At first we seek shelter beneath the camera cloth, but it is of no more use than so much mosquito-netting. Protecting the camera as best we may, we plod slowly back. Twenty yards from where we have been sitting, three Firebacks rush out from a clump of large-leaved plants and, with necks low, scatter in as many directions. This is our reward for the day's work.

I saw this species, however, a number of other times—once a pair unalarmed, scratching near an old decayed log, and feeding greedily on the termites which they uncovered. On another occasion, the glimpse was again but momentary, a sudden rush and rustle through the underbrush, never flying, but always with keen wit trusting to their great speed.

Many years ago Davison wrote that "these birds frequent the thick evergreen forests in small parties of five or six; usually there is only one male in the party, the rest being females, but on one or two occasions I have seen two males together; sometimes the males are found quite alone. I have never heard the males crow, nor do I think that they ever do so; when alarmed, both males and females have a peculiar sharp note, exceedingly like that of the large black-backed squirrel (*Sciurus bicolor*). The males also continually make a whirring sound with their wings, which can be very well imitated by twirling rapidly between the hands a small stick, in a cleft of which a piece of stiff cloth has been transversely placed. I have often discovered the whereabouts of a flock by hearing this noise. They never come into the open, but confine themselves to the forests, feeding on berries, tender leaves, and insects and grubs of all kinds, and they are very fond of scratching about after the manner of domestic poultry, and dusting themselves. When disturbed, they run rapidly away, not in different directions, but all keeping much together; they rise at once before a dog, getting up with a great flutter, but when once well on the wing, fly with a strong and rapid flight. They seldom alight again under a couple of hundred yards, and usually on the ground, when they immediately start running.

"I noticed on one occasion a very curious thing. I had stalked an argus, and while waiting to obtain a good shot, I heard the peculiar note, a sort of *chukun, chukun*, followed by a whirring noise made by the male Fireback, and immediately after saw a fine male Fireback run into the open space, and begin to chase the argus round and round its clearing. The argus seemed loath to quit its own domain, and yet not willing to fight, but at last, being hard pressed, it ran into the jungle. The Fireback did not attempt to follow, but took up a position in the middle of the clearing, and recommenced the whirring noise with its wings, evidently as a challenge, whereupon the argus slowly returned, but the moment it got within the cleared space the Fireback charged it, and drove it back into the jungle, and then, as before, took up his position in the middle of the space and repeated the challenge. The argus immediately returned, but only to be again driven back, and this continued at least a dozen times, and how much longer it would have continued I cannot say, but a movement on my part attracting the birds' attention, they caught sight of me, and instantly, before I could fire, disappeared into the jungle. The argus never made the slightest attempt to attack the Fireback, but retreated at once on the slightest movement of the latter towards it, nor did I see the Fireback strike the argus with either bill, wings or spurs."

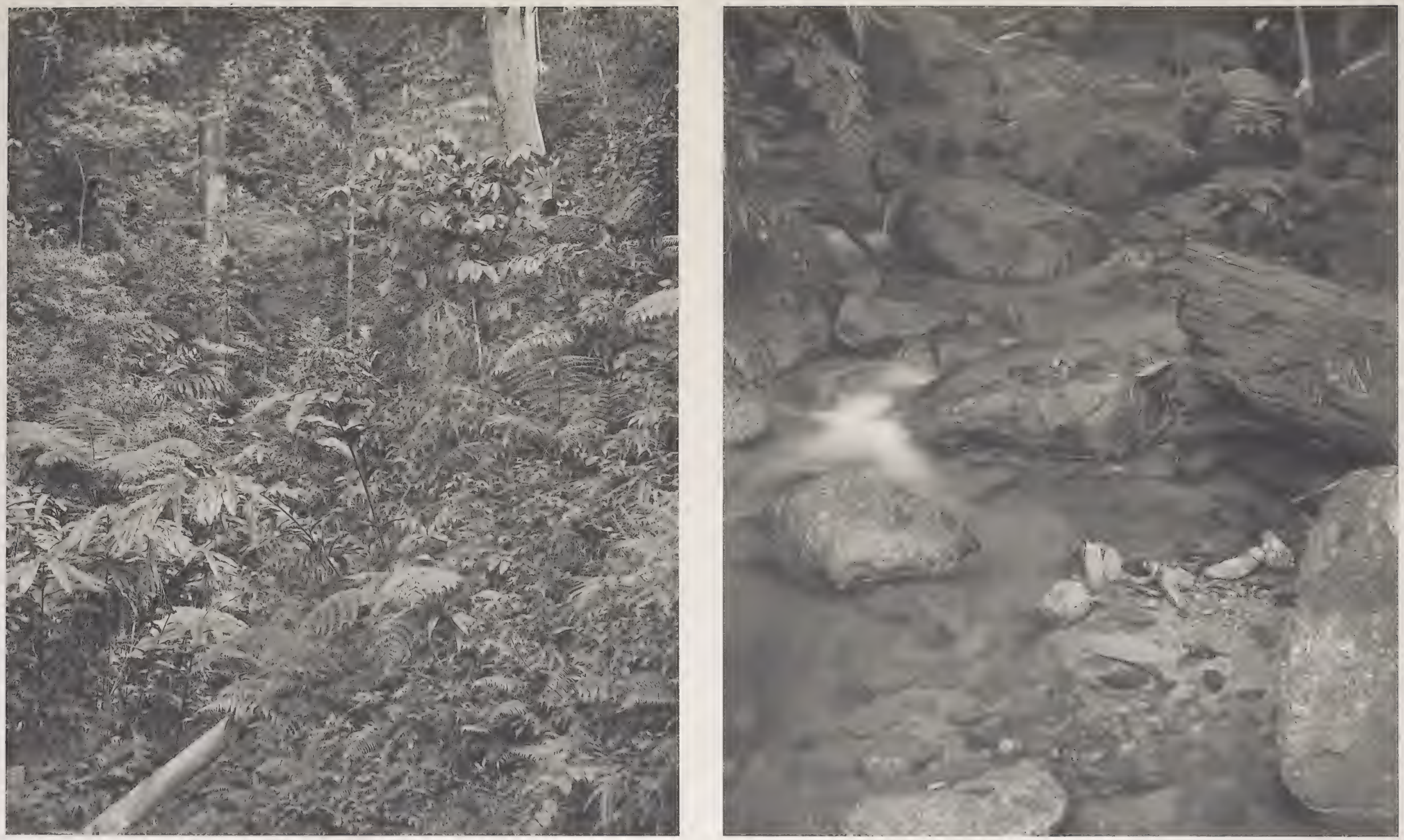
Nothing is known of the nesting of this bird in a wild state, but it has occasionally laid eggs in captivity. The average size of three such eggs is 53·6 by 39·4 mm. The surface is smooth, almost without gloss, and the colour is in general a pale, dull buff.

DETAILED DESCRIPTION

MALE.—Short contour feathers of the head, chin and throat black; neck, mantle, scapulars, shorter tail-coverts, breast and sides, black with a wide terminal fringe of purplish blue. Wing-coverts similar, but with the fringe shining steel-blue. On the greater wing-coverts, inner secondaries and longer upper tail-coverts the gloss extends more or less over the entire surface, and on the strongest marked feathers is slightly greenish. When the feathers show wear, however, this gloss is the first character to suffer, and the vane becomes dull blackish. Back and rump fiery bronze-red, the anterior portion with a decided golden sheen. This iridescence is confined to the visible portion of the feathers, namely, a very broad, terminal, rather disintegrated

HOME OF THE MALAYAN CRESTED FIREBACK

In the low, dense jungle of the Malay States, in thickets of thorny tangles and enmeshed vines, these birds live. To study them one must fight hosts of leeches and mosquitoes, mud and rain, or, when the sun appears, the steaming heat of these breathless places. Here the bulbuls sing sweetly, and gorgeous butterflies flap slowly past, and here these pheasants scratch among the dead leaves for food, or walk in the shallow water of jungle creeks, drinking and catching tiny creatures in the sand and gravel.



HOME OF THE MALAYAN CRESTED FIREBACK

margin, which is followed successively by an equally wide band of chestnut, and a narrow zone of steel-blue; the remainder being dull black. Primaries and secondaries are brownish-black unmarked. Two inner pairs of tail-feathers and the inner web and tip of the third, pure white; the remaining rectrices dull jet black. Feathers of the side, breast, sides of body and the flanks with a conspicuous shaft-stripe on the visible terminal third occasionally expanded distally, pure white in some cases, or chestnut, or a mixture of the two. Abdomen, thighs, under wing and tail-coverts sooty black, with no metallic gloss, or a small amount on the under tail-coverts.

Mandibles, spurs and claws yellowish horn, the former darker at the base; irides red; facial area bright smalt blue; legs and feet red, especially strong on the front of the tarsi and toes, the posterior surfaces out of the breeding season being reddish white. Weight, 5 lbs. Length, 720; extent, 940; bill from nostril, 23; wing, 286; tail, 266; tarsus, 109; middle toe and claw, 65. Spurs straight and stout, average length, 38.

Male Plumage Variations.—Although this species does not show any greater variations from the normal than many of the other pheasants, yet atypical individuals have caused great confusion. After careful comparison of all the specimens I could find in the museums of the Far East, of Europe and of America, together with those I was able to collect, I can find no sufficient grounds for separating the Sumatran from the Malayan birds, nor of recognizing the single aberrant captive specimen from an unknown locality, now in the Leyden Museum, as distinct from the Bornean crestless fireback.

If, on the other hand, such characters as have been utilized in the separation of these two forms are recognized as valid, then I should logically be compelled to distinguish three or four other "species" based on equally variable, and, it seems to me, insufficient characters. I have in mind one male bird with half the mantle of clear chestnut, and another full-grown male with the central rectrices half chestnut instead of pure white. It is wholly impossible to separate the Sumatran birds on the grounds that the shaft-stripes of the side and flank feathers are predominately buffy or chestnut rather than white. Over fifty per cent. of the Malayan birds show considerable chestnut on these feathers, and an adult male sent from Johore to the Raffles Museum, Singapore, for mounting, exhibited a greater amount of chestnut-red flank markings than I have ever seen on any Sumatran bird. Such being the case I see no logical possibility of distinguishing more than a single species of this northern Crested Fireback. As to *sumatrana* as defined by Büttikofer,[1] the variation *inter se* of the five male specimens which he lists is such as to give but slight value to the status of this form. I have seen at least a half-dozen adult specimens in the museums of the East and elsewhere which show as much variation in the chestnut and white of the rectrices and the amount of red on the flanks as in the above-mentioned five birds. As these specimens were divided between Sumatra and Pahang, I see no course open but to consider them as aberrant variations of *rufa* in the direction of *ignita*.

Female.—Head, neck, mantle and lesser wing-coverts uniform chestnut. Remaining parts of the upper plumage and wings finely vermiculated with black, this colour becoming more abundant posteriorly and giving the feathers a general darker tone. Flight-feathers brownish-black, the primaries faintly and the secondaries heavily mottled and streaked with chestnut on the outer webs. Longest upper tail-coverts like the secondaries. Tail-feathers chestnut-brown, the two central pairs mottled with black. In many specimens these markings are in the form of narrow, widely separated, but distinct transverse bands. Chin and throat creamy white. Lower neck and breast chestnut, margined with white on the sides. Lower breast, abdomen, sides, flanks and thighs brownish-black, often mottled with chestnut, with a wide margin of white all around. Lower abdomen with the brown reduced to a central mottling, the remaining portion of the downy feathers white. Under tail-coverts brownish-black, with dull rufous margins. Irides red; facial skin blue, not as bright as in the male; bill and cere dark, the edges of lower mandible and tip of the upper paler horn colour; feet and legs pale flesh, redder on the frontal scales. Weight, 3¼ lbs. Spurs sharp, but very small, the longest only 4 mm. Length, 602; extent, 806; bill from nostril, 18; wing, 255; tail, 207; tarsus, 95; middle toe and claw, 55.

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[1] "Notes from Leyden Museum," XVII. 1895, p. 177.

Female Plumage Variations.—The females show considerable variation, the chief being where, on the one hand, the entire dorsal surface is rich chestnut, mottled on the wings, back and rump with black; or again birds with the back, wings and rump pale buff, heavily vermiculated with black, the mantle being quite evenly dotted with black. These are the extremes, and we find all sorts of intergradations. Then too in a small percentage of specimens the white edging of the ventral plumage is found on the feathers of the upper neck and mantle. These variations are due neither to age nor locality.

Natal Down.—Short facial down pale buffy white; forehead pale buff, warming into rufous buff on the crown and rufous on the nape and hind neck. A narrow black line begins at the lower posterior edge of the orbit (with a tiny bit of black on the upper posterior margin), and extends backward and downward across the facial area and ear-coverts, merging with the rich orange rufous of the hind neck. The back is dark chocolate brown, the wing-coverts more chestnut, with a broad buff bar across the centre of the wing. Two well-marked buffy white lines begin on the scapulars and extend backward parallel with the wide chocolate dorsal area, to the rump. Outside of these in turn two chocolate bands, equal to the buff in width, extend backward from under the posterior dorsal edge of the wings, turning at last rather abruptly downward to the flanks. The inferior border of the facial area, the breast, sides and flanks are strongly tinged with buff, while the remaining ventral surface is creamy white. Iris dark hazel brown. The bill from nostril is 4 mm.; wing, 25; tarsus, 24; middle toe and claw, 18.

Juvenile Plumage, Male.—An interesting stage is shown by a bird with abundant juvenile plumage, but showing active traces of the first-year or post-juvenile moult. This moult, as we shall see in the description of the succeeding bird, seldom results in perfect adult hues and patterns; and although the bird may breed the coming season, its tail-feathers are seldom pure in colour, and its iridescence is not as strong as it will be after the second annual moult.

A male at this stage shows little or no signs of moult on the head and neck, the juvenile feathers being dull blackish-brown, with very faint rufous tips. The lower hind neck is paler brown, with here and there a very slight metallic glint. The mantle, back and coverts are rufous with obscure dark brown mottlings. On these areas there is a thin scattering of new jet-black feathers with a shining blue-green border. The longer juvenile wing-coverts are dark rufous-brown, with the rufous mottlings confined to the terminal border. The flight-feathers are all dull brown, unmarked.

The juvenile rectrices are narrow and curved, dark rufous with almost obsolete mottling of darker colour. In the specimen which we are describing there are fourteen, being moulted from without, inwards. The outer four are new, growing, dark feathers, becoming successively shorter as we proceed inward, until the fourth from the outer is very short. The next inner pair is wholly absent, apparently just shed, while the two central pairs are brown, narrow juvenile feathers, projecting well beyond the others. Now it is just these three inner pairs which will show the white in the adult plumage, so here (and in all the other moulting individuals examined) we have a very marked delay in the appearance of the central pairs, just as in *Ithaginis* we had a delay in the outer pairs.

The facial area is very sparsely covered with minute, brush-like feathers. Chin and throat white; ear-coverts, sides and lower neck like the upper. The ventral surface shows no signs of moult as yet. The feathers are dark brown, with a narrow white lateral fringe on the breast, increasing on the sides of the body, and especially on the belly, where superficially it eclipses the darker central portion. The moult of the primaries is proceeding regularly outward, all but the external five pairs having been shed. The spurs are sharp, but very minute. The bird measures, bill from nostril, 18; wing, 215; tail (juvenile), 122; tarsus, 74; middle toe and claw, 38.

IMMATURE MALE, COMPLETING FIRST ANNUAL MOULT.—A bird at this stage has more tiny, brushy featherlets on the facial area than the fully adults. In a typical individual the crest has begun to sprout, being about one-half grown. The dorsal plumage shows only about half the full amount of terminal iridescence, while the fire of the back is broken by black mottling, and an infusion of dull chestnut at the basal border. The longest tail-coverts are still unshed juvenile, being dark brown with mottled rufous tips instead of shining purplish-green.

The tail-feathers have been renewed and are full grown. The two central ones have a conspicuous black shaft-stripe for the basal three-quarters of the feather, while the basal fourth is wholly brown. The next pair is similar, except that black mottling covers the basal third of the outer web. The third pair has the white inner web clouded with dark, and a patch of chestnut at the tip of the outer web. The next has a patch of white and chestnut at the tip of the inner web, while the fifth shows only a tinge of chestnut in the same place. The two outer pairs are normal black.

The under-parts are almost wholly dead black. On the sides are a few purplish-blue tipped feathers, with a narrow shaft-streak of bright chestnut, terminating in a patch of mottling of the same colour. The outer two primaries are growing; all others have been renewed. This bird measures, bill from nostril, 23; wing, 253; tail, 195; tarsus, 106; middle toe and claw, 61. The spurs are sharp, stout and short and measure 10 mm. in length.

As to the change of colour without moulting which some authors describe at this age of the Crested Fireback, I can find not the least confirmation in the examination of museum skins, and in the case of the Bornean Crested Fireback, which I have bred under careful observation, I have discovered nothing except proof that the change in pigmentation, iridescence or pattern takes place by moult and renewal alone, except as I have stated before, where excessive wear destroys the high metallic gloss.

Immature Female.—Two immature females show the nape heavily edged with black, and the mantle edged and mottled with more or less solid black pigment. The banding is especially noticeable on the middle wing-coverts, and the secondaries are very heavily mottled with the same colour. On the lower parts, the black almost obscures the rufous of the breast.

SYNONYMY

Phasianus ignitus Raffles (nec Shaw and Nodder), Trans. Linn. Soc., XIII. 1822, p. 320 (Sumatra); Daniell, F.Z.S., 1882, p. 24; Elliot, Ibis, 1878, p. 412.

Phasianus rufus Raffles, Trans. Linn. Soc., XIII. 1822, p. 321 (Sumatra); Gray, in Griffiths ed. Cuv., III. 1829, p. 28.

Phasianus castaneus Gray, in Griffiths ed. Cuv., III. 1829, p. 28 (Penang).

Gallus macartneys Schinz (nec Temm.). Nat. abild. Vog., 1833, p. 28, pl. 93 (Sumatra).

Euplocamus ignitus Gray, Ill. Ind. Zool., II. 1834, pl. 39; Blyth, Cat. Mus. As. Soc., 1849, p. 243 (Sumatra); Blyth and Wald., Cat. Mamm. and Birds, Burma, 1875, p. 149 (Tenasserim River); Elliot, Ibis, 1878, p. 124.

Euplocamus vieillotti Gray, List Gen. E. 2nd ed., 1841, p. 77; Gould, Birds Asia, VII. 1852, pl. 15 (Malacca); Hume, Stray Feathers, II. 1874, p. 481 (Tennasserim); Hume, Stray Feathers, III. 1875, p. 324 (Tennasserim); Hume and Marsh, Game-birds India, I. 1878, p. 213; Hume and Dav., Stray Feathers, p. 438 (Pakjan); Elliot, Ibis, 1878, p. 413; Kelham, Ibis, 1881, p. 532 (Perak); Oates, Birds of Burma, II. 1883, p. 320 (L. Tennasserim).

Euplocamus rufus Hume, Stray Feathers, V. 1877, p. 121.

Euplocamus sumatranus Dubois, Bull. Acad. Belg. (2), XLVII. 1879, p. 825 (Sumatra).

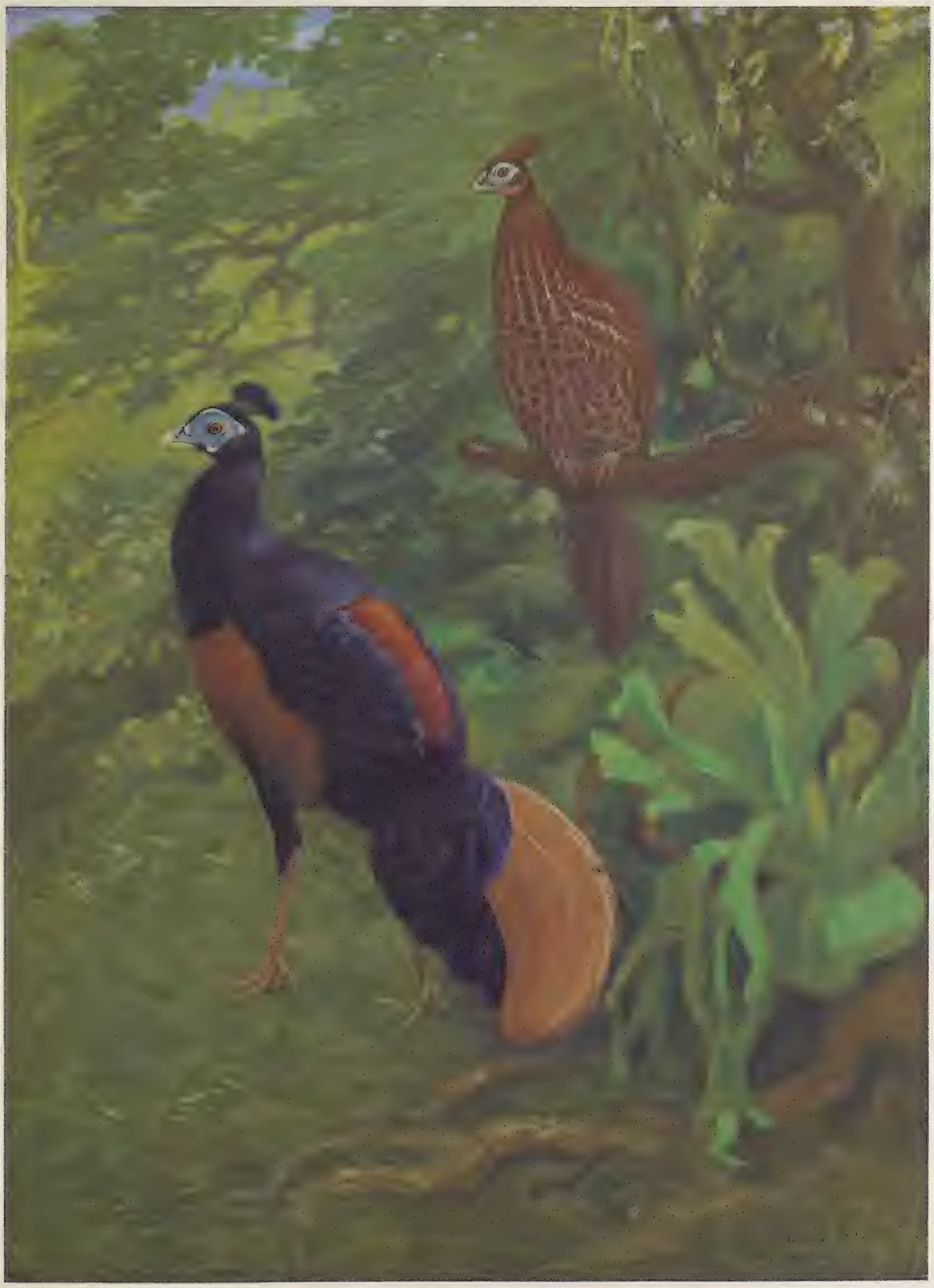
Lophura rufa Ogilvie-Grant, Cat. Birds Brit. Mus., XXII. 1893, p. 268; Ogilvie-Grant, Man. Game-birds, I. 1895, p. 244; Blanf., Fauna Brit. India, IV. 1898, p. 87; Oates, Man. Game-birds, I. 1898, p. 379; Sharpe, Hand-list Birds, I. 1899, p. 34; Oates, Cat. Eggs Brit. Mus., I. 1901, p. 52; Robinson, Jour. Fed. Malay St. Mus., I. 1906, p. 129; Robinson, Jour. Fed. Malay St. Mus., III. 1906, p. 56 (Pahang); Robinson, Jour. Fed. Malay St. Mus., V. 1913, p. 16; Stuart-Baker, Jour. Bombay Nat. Hist. Soc., XXVI. No. I. 1918, p. 10.

BORNEAN CRESTED FIREBACK

Lophura ignita (Shaw)

THIS splendid bird chooses to live in low, swampy jungle, coming out to feed in the small, shaded glades. In one such place, embowered with green and decorated with great elkhorn ferns, a family of Firebacks spent many weeks. Although not far from a native Dyak house, yet it was also close to a burial-ground, and the fear of evil spirits gave safety to the birds.

When standing quietly, the colours of the Fireback cocks merge with the hues of the jungle, but at the slightest movement the glittering back detaches itself from the spots of sunlight, and the blue-black body from the dark shadows, and the bird stands out in its full glory.



BORNEAN CRESTED FIREBACK.

BORNEAN CRESTED FIREBACK

Lophura ignita (Shaw)

NAMES.—Specific: *ignita,* from the Latin *ignis,* fire, with reference to the fiery metallic back and abdomen plumage. English: Bornean Crested Fireback; Fire-bellied Pheasant. French: Faisan à dos roux. German: Borneo Fasan. Native: Sempidan (Sea-Dyak).

BRIEF DESCRIPTION.—Male: Plumage in general black, glossed over most of the feathers with purplish blue. The back, rump, the entire belly and sides fiery bronze-red. Two inner pairs of tail-feathers, and inner webs of the third pair rich buff. A long, bare-shafted, tufted crest. Facial skin blue, legs and feet reddish. Female: General colour above rich dark chestnut, faintly mottled with black, neck paler chestnut; chin and throat white; breast chestnut, edged laterally with white; remaining under-parts dark brown, widely margined all around with white. Facial area blue; legs and feet reddish.

RANGE.—Borneo in general; introduced into the Island of Banka.

THE BIRD IN ITS HAUNTS

THE home of the Bornean Crested Fireback in the interior of Sarawak is amid low, swampy undergrowths, where the soggy, matted leaves give forth no sound to the step of bird or animal. In such a spot in the afternoon when the round sun-spots of noon have given place to long pencils of light, the splendid Firebacks come forth from the maze of calamus and other thorn-plants among which they spend the heat of the day and make their way to the little gravel water-courses which meander down to the rivers.

I remember one such little glade, densely embowered with overhanging vegetation. A rivulet trickles through it and between it, and the river is a dense impenetrable tangle of calamus, bamboo and thorny fern. Here a family of Firebacks elected to spend the moulting season. Although not far from the cleared ground around a native Dyak house, they have chosen wisely, for just beyond is a Dyak burial-ground, mounds covered with matting and a palm-thatch shelter. On the mat are dishes, and some Chinese jars of considerable beauty, filled with food and water for the comfort of the dead. No one but a white "Tuan" who fears not evil spirits would come here, so the pheasants are safe.

In such a place I watched silently on a certain 20th of July. I was perched between two great trunks, eight or ten feet from the ground, partly hidden by a drapery of lianas. A pair of rufous cuckoos were toying with small twigs and sticks just overhead, hinting that they have not reached the stage of complete cuculine parasitism, but had in preparation the flimsy type of nest which some of this family still fashion. They took no notice of me in their curious squawks and trills of love-making—sounds so unlike their usual monotonous note. A broad-bill, with plum-coloured waistcoat, black head and collar, and dark wings with yellow trimmings, watched for and caught all the insects which flew past a branch in front. A crash of twigs and small branches drew my eyes upward, and there I saw a tupaia or tree-shrew stalking its prey. How like and yet unlike a squirrel, moving at times with the same jerky starts and flicks of tail, yet with a caution which told of the hunter as well as the hunted. Now he spied what appeared to be a great beetle, and slowly and imperceptibly crept forward. Finally, he leaped upon and secured the insect, slipped, hung by one little paw, pulled himself up, spied me and burst into a series of squirrel-like barks, which in depth of profanity, if not exact tone, did credit to a Canadian red squirrel.

Sunbirds flitted everywhere, seeking for their insect prey in all likely and unlikely places. A shama thrush flew to a branch and scanned me closely, with now and then a graceful lift to the tail. What wonderful organs of expression are tails to birds of the thrush family! They take the place of eyebrows, hands, and mouth in this capacity.

The tupaia had vanished after its vituperative outburst, but I was now delighted to see on a slanting trunk a tiny tupaia, moving with infantile slowness, out on perhaps its first excursion. It needed little teaching, for it munched greedily at every ant which crossed its path. With a rush came a parent tupaia, seized its offspring by the neck or an ear, and rushed back with it, and up to a great mass of felt-like bark and leaves, into which it carried the youngster.

The shama sang softly beyond the glade, and I answered with the opening notes Whew! whe-whe-whe-whe-o! wheo-wheo! and with a flash of brown and white the bird came in swift flight to a branch on my right. The white feathers of its lower back were raised and its flirting tail spelled keenest excitement. Soon with high, far-off ventriloquial notes, sounding twenty yards away, it ran down its liquid scale and bubbled into the melody of which our cage-birds give but a parody. Before it flew off, a half-grown youngster added his saucy note to that of his parent. His wings were spotted; on his breast was a bar of black, and his throat was of uncertain mottled hue. But he flirted his half-grown tail and scolded right shamily!

What absurd similes come to one in such an isolated place! Many of the tall lily-like leaves about me had been injured by insects while they were yet in the bud, and now that they were unfolded, the rows of larger or smaller holes were carried completely across the leaf—exactly like the perforated music rolls of a pianola piano!

The ground on the little slope above which I was perched was partially dry, and through the leaves flat, spreading fronds of moss-like selaginella extended. As with so many of the low-growing plants, these were variegated, the tips of each frondlet being pale green in fine contrast to the deep shade of all the rest.

Two small, brightly-coloured pittas passed through the glade, now close together, throwing the leaves over their backs and eagerly seizing some morsel, now leaping like jerboas over logs and branches.

A tricolour squirrel sprang from bush to bush behind me, and then down across the rivulet by an aerial bridge. In passing he jostled the stem of a giant calamus, and now from the depths came a weird rhythmic *sssh! sssh!*—indescribably unreal, a sound of some fairyland. Eyes and ears refused to locate it except far away, yet I knew that at each surge of sound a thousand thousand tiny ants were shaking with all their might, vibrating the hollow stems in which they dwelt. It was a most soothing sound, and I sat for some minutes listening abstractedly. Then I suddenly saw a bird where none was a moment before. It was broad daylight and the sun was shining brightly through the foliage, but the splendid cock Crested Fireback within twenty feet of me was with difficulty detached from his surroundings. The iridescent blue and coppery-yellow were like deep shadow and a sun-lit patch of leaves. Quiet as the tree-trunk near him, for a moment he scanned every inch of the glade. By some miracle I escaped his eye, and then he walked slowly down to the rivulet, drank, wiped his bill and picked at the clay bank on the farther side.

As he walked on, three young males and two females followed. Their short spurs proclaimed the youth of the cock birds, and while doubtless one of the brown hens was his mate, which it was I could not tell.

After all had drank, two of them daintily catching the moisture dripping from the moss-ferns, all scattered along the rivulet gravel and began scratching in the shallow water. Now and then they seized something—whether tiny crayfish or insect larvæ I could not tell.

Once the broad-bill fluttered against a dead hanging vine and loosened several large dried leaves which fell noisily. The cock uttered a mumbled *Um-um! um-um!* and then a single sharp, keen whistle, which cut through the quiet air of the glade like a knife. One by one the pheasants passed from view down the little ravine. I had been vouchsafed a glimpse of a family of wild Firebacks and had not alarmed them. The fates had been kind.

When the last of the big, beautiful troop vanished, the glade seemed deserted indeed. In vain the sunbird sang his lay at my very elbow; even a mellow-plumaged little trogon on a bough near by could hold my attention but a moment. The King, with his Queen and Princes had gone—what were commoners now! I slipped to the ground and stretched my cramped limbs, and began to creep into the maze of thorny vines from which the birds had first emerged. Three steps on hands and knees and the vague, indefinite dream-sound arose, this time above and around me. Now that it was closer I seemed to detect a sinister note in its softness. Instead of a single tone, it seemed a myriad blended into one, with hundreds fraying out at the beginning and end. A sharp pain on my wrist caused me to start involuntarily, and looking up I saw an army of vicious jaws and stings waiting for my nearer approach. No human being could force his way to the centre of that clump of harmless-looking underbrush. Truly the secrets of this family of pheasants, at least in this little ravine, were safe for the present!

GEOGRAPHICAL DISTRIBUTION

The Bornean Crested Fireback seems to be very generally distributed throughout that great island, and wherever I have travelled it has always been by far the least rare of all the Bornean pheasants. We know of specimens from many parts of Sarawak, from Elopura, North Borneo; Pleyharie, South Borneo; and Mount Kenepai, West Borneo, besides many other localities. Its occurrence on the island of Banka, separated from Sumatra only by a narrow channel, must be looked upon undoubtedly as due to introduction by man. Otherwise it is difficult to explain its absence from the intervening island of Billiton, on which I found no trace of the bird, together with the fact that the general fauna of Banka is wholly Sumatran and not Bornean.

Such being the case, we can readily conceive of the possibility of hybridization taking place either in birds kept captive by natives or as a result of a stray bird finding its way into Sumatra and crossing with the indigenous *rufa*. This offers an alternative explanation of such aberrant specimens as have given rise to the various discussions as to the number of species in this group such as Büttikofer's *sumatrana*. From my own observations I am satisfied that they may all be resolved into variations of one or the other of the two closely related species *rufa* and *ignita*.

GENERAL ACCOUNT

I spent some time in and near the Dyak graveyard, which I have mentioned in the bird in its haunts, and concentrated my attention on the family of Crested Firebacks which there made their home. On the third day I saw them together and missed one of the young males. The following day I stumbled by accident upon a few remaining bones, including a leg and many feathers of this very bird, close to the bank of the river. Of course it was impossible to tell the cause of death. A host of little workers struggling with the last remaining tough tendons on the leg-bone, and two well-worn paths to a near-by nest, showed that at least the ants had profited by this windfall. Apart from this, tragedy did not visit the pheasants during the week or two during which I watched them.

They roosted together in a tree of medium size, heavily draped with hanging vines and surrounded by dense bamboo thickets. Once only was I able to see their forms dimly silhouetted against the sky. Three were perched close together, the others somewhat scattered. Early in the morning—how early I never learned—they left their roost and went towards the river, at least I found them riverwards on three separate occasions early in the forenoon. From the tracks I learned that they had no regular route, but sometimes followed the gravelled rivulet, or again went through the marshy forest on either side. Concerning their forenoon occupations I could obtain no information, although I should say that they fed and scratched near or along the river bank.

During the heat of midday, twice they returned to the shelter of the bamboo undergrowth near their roost, once they remained quietly in the shade of a tree on the very bank of the river, and this, while several Dyaks were working on a canoe in full sight, but some distance up-river on the opposite sandbank. On the other days they evaded all my efforts to find them. I had chosen my look-out wisely, although it was the general jungle life which came to the river that I had hoped to see, and the pheasants came rather as a surprise. A thick snarl of grape-like vines had grown entangled among the branches of a stout tree, and with a little cutting and arranging I was able to lie outstretched well above the high bank, partly over it and partly over the water itself. The shadow from the thick mesh of bare stems had discouraged the growth of foliage beneath, so that my view downward through the interstices was almost clear. Below me was a narrow cleft in the bank where the jungle rivulet trickled into the waters of the river. Bulbuls and purple butterflies amused

HOME OF THE BORNEAN CRESTED FIREBACK

The home of this bird was reached by means of a seventy-foot Dyak war canoe, in which I was paddled up the rivers to the inland jungles. Here, in the haunts of gaily coloured pittas, of glittering sunbirds and the glorious tropical orchids, these birds live and court their mates and rear their young. Often the first hint of their presence is the call of the cock, a low, mumbled *Um—um! Um—um!* followed by a single, sharp, keen whistle, which cuts through the warm, quiet air like a knife.

HOME OF THE BORNEAN CRESTED FIREBACK.

me for a time, and I had made some interesting notes on river birds, when an old wild sow with a half-grown young one came slowly along the edge of the water. Hardly had they appeared when the Dyaks on the other shore had occasion to hammer smartly on their upturned canoe. The mud-caked porcine matron whirled facing the sound, erected her tousled ears, and concentrated her whole being in obtaining information of the danger through her quivering nostrils. They told her nothing, and her little pale-winkered eyes evidently carried no image of the distant Dyaks to her brain. The sound was not repeated, but the memory of it remained vivid, and the habit of caution of a lifetime and of untold other lifetimes in the past, so deeply implanted in that porcine brain, conquered, and she turned with a low grunt, and with her offspring at her heels trotted back out of sight. My pheasants were the next to appear, as I have said, wholly unexpectedly, and after pecking vaguely about for a time, they collected in a compact group in the dense shade of a river plant, and there for half-an-hour held low converse with each other, preening their plumage the while; at least they kept up a low confidential clucking or mumbling, which, to my ears, indicated supreme contentment. When they moved off into the jungle again, I descended, as I was slowly baking in the sun, and the network of liana stems on which I lay was fairly hot to the touch.

I caught many another sight of the birds on succeeding days, but apart from the ever-vivid thrill which their appearance produced, I found them as uninteresting as domestic fowls. They seldom uttered a note; they pecked and scratched, and ate and preened and slept! It was the season of moult and I could expect little more from them than I observed. Once only I heard the full vocal and wing challenge—a subdued *wooonk-k!* (whirrrrr)—*wooonk-k!* (whirrrrr). Indeed, I got more from them in the way of practice in stalking and knowledge of what I could do when in the presence of wild pheasants without being observed, than I acquired valuable facts of their life-history.

I was impressed again and again with their invisibility when perfectly quiet and the ease with which one could distinguish them even in the dimmest recesses of the forest when any part of their body was in motion. Thus I came to realize the tremendous importance of their method of movement—quick, sudden jerks of head and neck—a single motion if possible—in snatching a beetle or other insect, and then a period—a much longer extent of time—of absolute immobility. This reduced the perceptive periods of danger to the shortest space of time, and gave to the birds all possible opportunity for the detection of danger, they themselves at the same time being least perceptible to possible watching enemies.

Watching the full-grown cock Fireback feed for ten or fifteen minutes at a time—as I did once—I was impressed with the fact that such a period is divided into two very unequal parts, first, the search for, snatching and swallowing of food, and second, the looking out for danger. It seemed as if a few seconds less to the first division would result in starvation; perhaps a single second deducted from the latter might bring destruction! Never for a moment was there any relaxation; any sensible period of transition from one to the other. It was complete concentration on an insect, discovering it, seizing it, and then at the very moment of swallowing, the head and neck would shoot up, and the keen eyes were on the watch; twin scarlet search-lights of intelligence, with no need for the head to turn, as would be necessary in ourselves or in such a *pursuer* as a civet cat, but so set by nature on opposite sides of the head that they took in almost full measure of the surrounding circle of three hundred and sixty degrees of possible danger. When I gave up expecting battles and courtship displays and other intimate doings of the lives of my well-armed but moulting pheasants, I gave close attention to such little details as I have mentioned above, and soon saw that there was a perceptible difference in the behaviour of the old and the young males. The latter were apparently full-grown in size, and as their moult was about over, they differed in general appearance hardly at all from their parent. Only the short spurs, and a few remaining juvenile feathers stamped them for what they were. But a more intensive study showed many traits which set them apart, although no signs of affection or of actual dependence were ever noticed. These young pheasants were far from being as much on the alert as the old bird. They had many moments of abstraction, of idly doing nothing, and although they invariably ended by shooting up the head and neck to full attention, yet the few seconds which preceded this would have quickly spelled death if such a method was persisted in after they began to shift for themselves.

This observation led me to wonder if I could not distinguish between the females by some such mental field mark. So the next time I saw the birds I devoted myself to solving this point. I succeeded at the expense of much bodily suffering. To be able to get near the birds I crawled under one of the Dyak grave mattings, and bending it over in front of my face I had an ideal point of vantage.

But I soon found that one may not lie quiescent for hours upon a Dyak's grave with impunity. I had disturbed a populous city of ants—innocuous as to bites or stings, or I should not have been able to lie still for a moment—but afflicted with an inordinate curiosity as to the meaning of this strange intruder. They certainly left no portion of my clothing unexplored, and it took all the will-power I possessed to restrain myself and disregard the scrambling host. Then I realized that certain nerves in my body were going to sleep under the unaccustomed pressure, and it was not until I rose and shook the dirt from my person that I learned the fact that every centre of drowsy sensation had been a hungry leech who had feasted to repletion while my attention was distracted by the pheasants. But with all the discomforts of my afternoon's vigil I felt well repaid for succeeding in my desire, and the pleasure of having penetrated ever so slightly into the mental life of these splendid birds soon eclipsed all remembrance of my small but active tormentors. The first time the birds approached I feared they would pass me some distance away, too far for careful watching, but luckily one of the young males pursued some flying insect in my direction, and then found a feast of plenty, and his vigorous efforts in scratching among the leaves attracted the attention of the remaining birds, and all were soon gathered in the same spot. I had an excellent chance of observing the two females, and within a minute's time I had fully made up my mind which was the older—the probable other parent. Even she, however, did not quite equal the adult male in constant alertness. I fancy that this was not individual, but sexual, a phenomenon which I afterwards noticed more especially in the behaviour of the white-tailed pheasants (*Lobiophasis*) in the face of danger. The hen's very protective plumage seems to demand less constant watchfulness.

The young female—having the added cause for negligence of parent protection, was positively regardless of what might threaten. She gave herself wholly to the pleasure of eating, with only now and then a perfunctory glance around, with no motionless periods whatever, but scratching vigorously all the while. It is exceedingly interesting that while in the adults continual consciousness of danger should be so acute, nevertheless it should be manifested in so defective a manner in nearly grown birds, in which total independence has not as yet called out the need for the perfect exercising of this function.

I have mentioned several times the habit of scratching among the leaves for insects, and that I saw the birds again and again taking small insects or other little creatures from leaves. When the birds are feeding on the move, to or from the river, they seem chiefly to look for such food, but when more or less settled down in one spot, I noticed them more often plucking at the leaves and young grass-like growths. The crops of a number of birds indicated that seeds and leaves were the main source of food supply, while it was only occasionally that insects actually predominated. The most common proportion was a goodly number of seeds of various kinds, a less amount of leaves and comminuted vegetable matter of a similar nature, with a scattering indication of small insects. These latter consisted almost entirely of ants and small beetles, either small iridescent flower beetles, or grubs and ground coleoptera. An acorn-like fruit was found in several cases, called by the natives *bompeli*.

CAPTIVITY

One day on the Upper Rejang River in Sarawak, a Dyak brought me two Crested Firebacks, a cock and a hen, in coarse woven native "quakes" or round baskets. They had been trapped together at the edge of a paddy field, and the savage said through the interpreter that they were "man and wife." I took this as a good omen, and as it was near the end of my stay I did not sacrifice them for the sake of science, but placed the birds in more comfortable quarters, and in the semi-darkness of half-covered cages began to accustom them to a diet of paddy and what other vegetables I could procure. They soon became rather quiet, and in fact within a week would show but little fear even when the food dishes were being cleaned and filled. The cock, at first pecking fiercely at my hand from anger, soon appreciated that each time I approached, a large fat insect was dropped within his cage, and he soon took the grasshoppers and beetles direct. They were such model captives that they had a most wholesome effect on my other birds, and did much to quiet two particularly nervous Argus females and a covey of wood quail. On the down-river journey they were perched high up on the matting roof of the war canoe, and made the journey safely. Finally at Singapore they started for their final destination in most elaborate crates of teak-wood fashioned by the skilled hands of Chinese carpenters.

Several weeks later, three of the Bornean Crested Firebacks were turned out in a roomy aviary at Bernardsville, New Jersey, where they stretched their wings, and preened their plumage in comfort. The "man and wife," if such they had been, would have none of each other, but the splendid cock bird cast his affections upon a young hen which was in the same lot. These paired off, and made things so unpleasant for the other pheasants in the paddock that all had to be removed. The hen then made a rough hollow under a dense bush, lined only with the bent, dead grass stems which happened to be growing on the spot. Here at intervals of one and two days she laid six eggs, and on these she sat faithfully for twenty-four full days. This period of incubation lasted from July 21 to August 14. The cock never took his turn upon the nest, but was very faithful, fairly wearing a path in his circling guard duty several yards distant from the spot. I never saw him approach closely to the nest, but he was very pugnacious, and never failed to make a pretence of attacking any one who approached the place where his mate was sitting.

The five young chicks which hatched, left the nest within a few hours after emerging from the shell, and kept very close to their mother, hardly leaving the shadow of her body for the next two days. As soon as the chicks had left the nest the cock joined his mate, and from this time onward they were constantly together. The cock took his full share in feeding the young birds, calling them to him and giving them small morsels as frequently as did the hen. Whenever they crowded under him, attempting to brood, however, he apparently did not understand what was expected of him, as he would walk slowly away, lifting his feet very high so as not to crush the little downy creatures. His attitude towards danger also changed with the sudden increase of his assiduity in caring for his offspring. When any one approached he slunk away, holding body and tail low, making himself as inconspicuous as possible. The chicks at such a time behaved much like young grouse or quail, separating at the first note of danger from the mother, pushing deep into the grass, or squatting flat as their little bodies would allow if no shelter was near. The hen pheasant presented a complete antithesis to these tactics. Instead of slinking off or of attempting to hide, she ruffled up every feather on her body, her wings were half spread and all a-tremble, her red eyes dilated and fairly blazed with righteous fury. Then with shrill squeaks—apparently too full of emotion to voice her feelings in any louder way—she would fairly hurl herself at the intruder, sometimes striking one headlong as high as the knees; then, falling to the ground, she would cling with feet and claws to one's shoes, wings spread and drawn around in a semi-circle, like an infuriated owl, pecking with all her might at shoes and ankles. She presented a picture of absolute fearlessness and mother fury. Pushed away with one foot, she returned at once with undiminished vigour, and not until one had beaten a retreat did she slowly and reluctantly return to where her young had implicitly obeyed her warning, remaining crouched and silent.

In about a week the young birds were able to use their wings with considerable skill, and from this time on, when alarmed and given the danger signal, they *flew* off in various directions, radiating out on every side except that of approaching danger to the limits of their paddock before settling and crouching. In two or three weeks the hen accepted the occasional visits of human beings as a necessary, normal event, and the moment she ceased warning her brood, just so quickly did they, too, cease to show fear, and all became reasonably tame. The year following this, the same cock and hen bred again. After the first autumn moult the young birds are superficially hardly distinguishable in colour of body plumage from their parents.

DETAILED DESCRIPTION

Adult Male.—Feathered parts of the head, with the exception of the crest, very dark dull brown. Crest composed of a number of feathers, each showing a dense tuft of long, loose terminal barbs at the end of an elongated bare shaft. The neck plumage is also loose and rather disintegrated, and, like the crest, is strongly glossed with steel-blue. The breast, mantle, scapulars, wing-coverts, inner secondaries and upper tail-coverts are dull black on the basal portion, and strongly glossed with metallic purplish-blue over the distal part of the feathers. Most of the feathers of the dorsal plumage show a more or less distinct terminal fringe with steel-blue sheen, this character being especially marked on the upper tail-coverts, where the fringe is quite long and disintegrated. When a single upper covert is examined, the loose terminal fringe seems to be separated from the main proximal part of the feather by a narrow, velvety black line. Manipulation, however, shows that this is merely an optical effect caused by a changed incidence and refraction of the rays of light. This results from a sharp upward bend in the vane as a whole—a narrow transverse wrinkle clearly evident both to the sight and touch. Posterior to this bend the feather is normal, closely connected into a solid vane. That portion of the barbs forming the fringe, from near the bend to the tip of the feather, while possessing the usual number of barbules, are wholly without barbicels, the barbs thus standing apart in the loose detached fashion so characteristic of this portion of the feather in many pheasants.

Back and rump fiery metallic coppery bronze, decidedly darker than in the Malayan bird, more red than golden. Examining a typical feather from the lower back we find it measures about 80 mm. in length. Of this forty, or a little over half, consists of the basal disintegrated grey down. Then the contour portion begins abruptly, a zone of some 20 mm. dark brown changing to black, the distal portion glossed with steel-blue. The terminal 20 mm. is divided into a shorter portion of dark, dull maroon, giving place abruptly to the long (7 mm.) fringe of glowing bronze red. There is no trace of the *post-fimbriæ* wrinkle. Proceeding outward, the secondaries lose first the bluish gloss, and then change from dull dead black to dark brown. The primaries are still paler, sooty brown. The two inner pairs of tail-feathers and the inner web and tip of the third are clear rich dark buff. The bases of these inner feathers are dusky, and all the remaining rectrices are unglossed dead black.

Beneath, the purplish-blue breast zone ends abruptly, and the entire lower breast, abdomen, sides and flanks are of the same fiery metallic bronze red as the back, except lighter. In extremely coloured individuals the feathers of this entire area lack black pigment, the main portion of the vane being dark chestnut. Usually, however, the feathers down the mid-line are at least half black, and variations of this colour may be found up to where the chestnut and metallic red colour is confined to flank patches. I collected one specimen of this extreme variation in the hinterland of Sarawak. The amount of black pigment present in these ventral feathers is wholly individual. In two male birds from the same set of eggs, hatched and reared by their mother, at the moult into the first-year plumage, one showed solid chestnut on the posterior ventral surface with only extreme basal black mottling; the other had only the margins chestnut—comparable in extent with the white margins on the ventral plumage of the female. And this indeed only on the sides and flanks, the mid-breast and abdomen feathers being wholly black or with two small lateral spots of chestnut. Thighs and under tail-coverts dull black, glossed with greenish-blue on the terminal portion of the feathers.

Irides red; legs and feet in the breeding season reddish, fading at other times to a fleshy pink; facial skin bright blue at the period of courtship, considerably paler during the rest of the year; mandibles horny white; spurs and claws yellowish horn. The spurs are unusually strong, long and slightly curved, reaching a length of 35 mm. or more. Weight about 4½ lbs. Length, 650; extent, 845; bill from nostril, 21; wing, 271; tail, 253; tarsus, 111; middle toe and claw, 58 mm.

VARIATION IN MALE PLUMAGE.—To show the variability of even a single character in birds supposed to be sufficiently homogeneous and distinct to form a esparate species, let us consider the white colour of the tail-feathers of the males upon which Büttikofer bases his *sumatrana.*

His specific characterization is "Similar in colour to *L. ignita*, with the exception of the centre tail-feathers, which are pure white, with a faint ochrous tinge on the basal part as far as it is hidden by the upper tail-coverts" ("Notes from Leyden Museum," XVII. 1895, p. 178).

(*a*) Leyden Museum specimen.—Central pair of rectrices and inner web of second pair white.—No locality.
(*b*) Leyden Museum specimen.—Two central pairs of rectrices and inner web of third pair white.—Palembang, Sumatra.
(*c*) An "albinisme" male from Amsterdam Zoological Garden.—No mention of white on tail-feathers.
(*d*) Type male in Brussels Museum.—Dubois describes the tail colour as follows: "Queue noire, les quatre rectrices médianes d'un blanc roussâtre, la barbe interne de la paire suivante également d'un blanc roussâtre" ("Bull. Ag. Belg." (2) XLVII., p. 825). The ochraceous hue of the basal concealed portion of the feathers is so pronounced that Dubois considers the whiter exposed area has been faded out to its present colour.
(*e*) Vienna Museum specimen.—Said to agree with the two Leyden specimens, which, as they differ in the amount of rectrice white, is obviously impossible.
(*f*) British Museum specimen.—This much-described individual (Sclater, "Proc. Zool. Soc.," 1863, p. 119; Grant, "Brit. Mus. Cat. Birds," XXII. 1893, p. 289; Grant, "Hand-book Game-birds," 1895, p. 247) is classified by Büttikofer under his *sumatrana.* Of the white in the tail Sclater says, "*rectr.* 4 *mediis albis*"; Grant, "middle pair of tail-feathers white," but both are wrong, for as the inner and third pairs are white and the second pair is missing, the inner three pairs of rectrices were undoubtedly originally of this colour. The other character of red upon the flanks seems to be almost as variable and from the fact that in this British Museum specimen the golden hue of the sides is almost white on the anterior portion, I should be inclined to think that the "albinisme" of specimen *c* was but an extreme aberration due to hybridism or abnormal variation.

ADULT FEMALE.—Entire upper surface, neck all around and breast chestnut, the fore-neck and occasionally the hind neck and upper mantle with white lateral margins to the feathers. Crest with terminal plumes as in the male, but with much shorter bare basal shafts, and slightly darker chestnut than the head. Short feathers of the head and upper neck, chin and throat somewhat recurved. The chin and throat are white. From the rear mantle and wing-coverts backward there is a constantly increasing mottling and vermiculation of black pigment, causing the chestnut to appear darker and darker as we proceed toward the tail. On the outer webs of the secondaries and primaries, and on the shorter and median upper tail-coverts, the chestnut and black are of about equal proportions. The inner webs of the flight feathers are dark brown, paler in the primaries. The tail-feathers are quite variable; sometimes the two central pairs and the longest tail-coverts are heavily freckled or mottled with dark chestnut—though this is always subordinated to the black (the reverse pattern of the anterior dorsal surface)—while again there will be hardly a trace of the lighter colour, all the rectrices being uniformly black.

The entire lower breast, abdomen, flanks and anterior thighs sooty black, broadly margined all around with white. In the disintegrated, downy feathers of the lower abdomen the white margin encroaches upon the black centres, turning them impure brown and restricting them to a small central area. The under tail-coverts and the posterior sides of the thighs are dull black, tipped more or less strongly with dark chestnut.

Irides red; legs and feet yellowish-white; facial skin blue, duller than in the male; mandibles horny-white; spurs sharp but abortive, only about 3 mm. in length. Weight 3½ lbs. Length, 580; extent, 778; bill from nostril, 18; wing, 258; tail, 190; tarsus, 89; middle toe and claw, 50.

NATAL DOWN.—Four day old chick. Warm rufous on crown and nape, becoming black on scapulars and entire back. Rufous buff bar across centre of wing. Laterodorsal longitudinal bands almost obsolete. Face pale rufous, a black line obliquely back from the orbit across ear-coverts, ending just beyond. Chin, throat and belly buffy white, a strong orange-buff tinge across breast and down sides and flanks. Primaries just appearing at the tips of the sheaths.

A THREE WEEKS' OLD CHICK is much the same, except for great development of wings which cover the entire body, extending well beyond the tail. Coverts and flight-feathers dark brownish black, the former with buffy tips and a jet-black sub-terminal band. The inner secondaries with very slight buff edgings, other flight-feathers unmarked. At this age, seven primaries and eight secondaries are functional. Primary No. 8, although over 13 mm. in length, is still ensheathed, and Nos. 9 and 10 are as yet invisible.

The tail-feathers have just broken their sheaths, bearing aloft the pale rufous down.

JUVENILE PLUMAGE.—In a chick of seven weeks—four weeks older than the one above—considerable change has taken place. The entire body and the rear crown are clad in short but fairly complete juvenile plumage, while the head and neck are still downy.

On the rear crown, sharply limited on all sides, on or just anterior to the place where the adult crest will appear, is a dense triangular patch of loose chestnut feathers, somewhat shaded with black. The entire hind neck is downy, but the mantle and back are densely covered with a growth of rich chestnut, black mottled feathers. At this stage the sexes are distinguishable, the males having the dorsal plumage much darker than the hens.

The eight primaries are growing strongly, the eighth still lagging far behind, about half as long as the rest, while Nos. 9 and 10 are just detectable as two minute sheaths about 6 mm. in length. The tail of sixteen almost black feathers is growing rapidly, and from the outer pairs inward, the three outer pairs having already completed their growth.

A male in a somewhat later stage shows the full juvenile plumage, the whole top of the head from the cere back now being feathered. Down the nape and hind neck, however, there is only a very narrow plumaged area, two lines of feathers only, all the rest of the hind and side neck being still covered with a dense growth of the orange rufous down. The crown feathers are black with very wide chestnut tips, which, however, are absent on the nape and narrow nuchal line, these showing slight bluish glints among the black. The dorsal body plumage—mantle, back and rump—is basally dark brown, with an indistinct black sub-terminal bar, and a wide dull rufous mottling at the extremity.

The scapulars and wing-coverts show this pattern to a very pronounced degree, and thus present a very different appearance, the characters most apparent being a rich rufous tip or terminal band, followed by a black band or two lateral black ocelli. The inner secondaries show a very slight rufous marginal mottling, but the flights and rectrices are otherwise plain brownish black.

The under-parts exhibit a fairly dense growth of white feathers on the chin and throat, but the lower neck has only a very sparse covering of feather sheaths, which show the skin almost bare. The ventral plumage is of black-centred feathers with the loose webbing margined with grey or white—a most indescribable mass of downy plumage with no regular character or pattern.

The post-juvenile moult has just begun in the primaries. No. 1 is well grown, and Nos. 2 and 3 have just been dropped. Nos. 9 and 10 are still growing, and even No. 7 is not yet dry.

The tail is about in the same condition, or a trifle more delayed. All the juvenile feathers are full grown, but the outer pair have been dropped, and the new black incoming feathers already measure 33 mm., with about 12 out of the sheath.

TRANSITION BETWEEN JUVENILE AND FIRST YEAR PLUMAGE.—Three males collected in August are all in about the same condition, half moulted into adult dress.

In all these birds the long, rufous crown feathers stop abruptly at the hinder crown, their rear edges overhanging the shorter posterior feathers like a cap. From directly at their posterior edge the first few crest feathers are sprouting. The occiput, nape, chin, throat and neck feathers are short and recurved; those of the occiput, ear-coverts and side neck are dark brown; the chin and throat white, with a sprinkling of new black feathers. The nape and hind neck show a wide border of shining greenish blue, not the purplish blue of the fully adult. The change shown by the moult of the wing-coverts and flight-feathers is abrupt, from the faded brown, mottled-tipped old feathers to the new brownish black ones. The under-parts show as yet little change from the chaotic, near-female, brown, grey and white of the juvenile plumage, except along the sides, where the golden rufous shows as two broad solid bands.

In all three individuals the stage of the wing moult is almost identical. The inner five primaries are new, No. 5 being still ensheathed, while the outer five are full grown but unshed. The outer secondary is still unshed; the second is full grown. The next five are new, more recent as we proceed inward, until the fifth is merely a short unbroken sheath; the next inner six are unshed.

The persistence of the first secondary is very remarkable. Not only in these birds, but in another of seven months, which in many respects is full plumaged, the right outer secondary still persists, the left having just been shed. The succeeding nine secondaries are full grown, the next three being, like No. 1, still old, unshed feathers.

Another focus of delayed growth is found in the central rectrices. In the three males just described, the three inner pairs of tail-feathers are still unshed, juvenile feathers, although *all* of the others are new and well advanced. In all there is a regular gradation in growth from the outer to the fifth pair, the latter being only 25 or 30 mm. beyond the tip of the sheaths. The narrow, brown, worn tips of the three inner pairs extend some 50 mm. beyond the longest new feathers, giving all the birds a most curious appearance. At this age the spurs are about 5 mm. in length, sharp, thin, triangular scales.

The measurements of the five stages of growth in male birds which I have described, together with those of the adult male are as follows, tabulated for easier comparison.

	Bill from nostril	*Wing*	*Tail*	*Tarsus*	*Middle Toe and Claw*
Four day chick	6	20	—	23	16
Three weeks chick	8	78	10	25	18
Seven weeks juvenile	11	129	66	35	25
Older full juvenile	15	210	137	68	46
Transitional, juvenile to first year . . .	18	235	Juv. 168 New 127 (Not full grown)	86	51
Adult male	21	271	253	111	58

IMMATURE FEMALE.—The sexes are well marked first in the early juvenile plumage when the mantle and breast begin to show a preponderance of dark colour in the male, or rufous in the female. The head, nape, mantle and lower throat in the latter sex moult into almost solid chestnut, shading into white on the upper throat and chin. The black ocelli or sub-terminal band on the scapulars and wing-coverts are much more conspicuous than in the male, owing to their pale, rich chestnut setting. The secondaries also show the chestnut mottling much plainer in the female sex.

The ventral surface of the immature female is more definitely coloured, the regular pattern showing dark brown centres, broad white lateral fringes and an equally well-marked terminal band of chestnut. This pattern extends well down the sides of the body, but on the lower breast the white begins to eclipse all other hues, until on the belly it wholly replaces them.

One young female shows the inner six pairs of rectrices still unshed, while the two outer pairs are represented by tiny sheaths. In another the three central pairs are still unshed. All show the same gradual moult from outside inward as in the males.

SYNONYMY

Phasianus ignitus Shaw and Nodder, Nat. Misc., IX., pl. 321; Gray, in Griff. ed. Cuv., III. 1829, p. 30.

Fire-Backed Pheasant Lath., Gen. Syn. Suppl., II. 1801, p. 274.

Gallus macartneyi Temm., Pig. et Gall., II. 1813, p. 273; Temm., Pig. et Gall., III. 1815, p. 663.

Gallus macartnyi Steph., in Shaw's Gen. Zool., XI. 1819, p. 218 [Part].

Houppifer ignitus Guérin-Méneville, Icon. Règ. Anim. Ois. 1829–38, p. 26, pl. 3, fig. 3.

Euplocomus macartneyi Temm., Pl. Col. V. in text of genus *Lophophorus*, 1830, p. 3.

Euplocomus ignitus Gray, List of Birds, Part III. 1844, p. 26; Muller, Verhandl. Land-en, Volkenk, 1839–44, p. 376 [Banjarmasin]; Low, Sarawak, 1848, p. 411; Sharpe, Ibis, 1879, p. 270 [Lawas and Mengalong Rivers]; v. Pelz., Verh. Ges. Wien, XXIX. 1880, p. 531; Sharpe, Proc. Zool. Soc., London, 1881, p. 800 [Sandakan]; Nichols, Ibis, 1883, p. 90 [Silam]; Elliot, Auk, VIII. 1891, p. 15 [Kinabataugan R., N.E. Borneo].

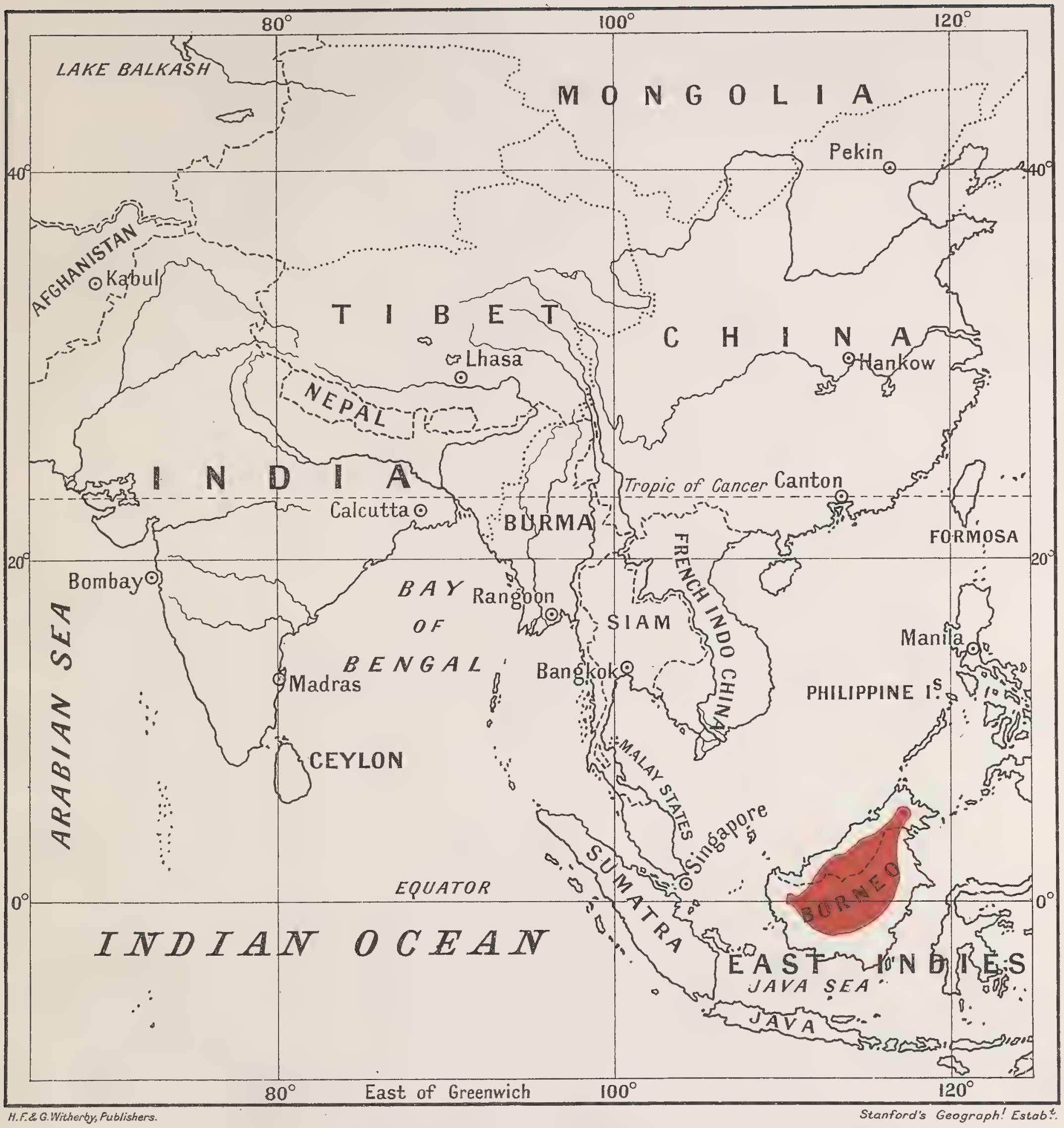
Gallophasis ignitus Gray, Gen. Birds, III. 1845, p. 498.

Euplocamus nobilis Sclater, Proc. Zool. Soc., London, 1863, p. 118, pl. XVI.; Sclater, List of Phas. 1863, p. 7; Gray, List Gallinae Brit. Mus. 1867, p. 351; Sclater, Proc. Zool. Soc., London, 1868, p. 261; Gray, Hand-list Birds, II. 1870, p. 259; Elliot, Proc. Zool. Soc., London, 1871, p. 138; Walden, Ibis, 1872, p. 382; Elliot, Mon. Phas. II. 1872, pl. 27; Salvad., Ucc. Borneo, 1874, p. 306; Elliot, Ibis, 1878, p. 414; Sharpe, Ibis, 1879, p. 234 [Sarawak]; Sclater, Ibis, 1880, p. 371; Guillem., Proc. Zool. Soc., London, 1885, p. 416 [Silam, Sandakan]; Everett, List of Birds, Borneo, 1889, p. 199 [N. and S. Borneo].

Lophura ignita Ogilvie-Grant, Cat. Birds Brit. Mus. XXII. 1893, p. 288.

LOBIOPHASIS

WHITE-TAILED WATTLED PHEASANT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H.F.& G.Witherby, Publishers. Stanford's Geograph! Estab^t.

MAP SHOWING THE DISTRIBUTION OF THE WHITE-TAILED WATTLED PHEASANT.

Lobiophasis bulweri.

LOBIOPHASIS

WHITE-TAILED WATTLED PHEASANT

Family PHASIANIDAE

Subfamily PHASIANINAE

Genus *LOBIOPHASIS*

THE remarkably specialized Bornean pheasant which alone forms this genus finds a quite natural position at the extremity of specialized radiation of the *Gennaeus-Lophura* group. As the maximum of plumage development has found vent in the secondary wing-feathers of the argus and the tail-coverts of the peacock, so in the Bornean Wattled Pheasant it is the tail itself which, in number of feathers, has exceeded all bounds for the family, and in the male consists of more than thirty feathers.

No crest is present, but much of the head is bare of feathers, with the addition, in the male, of three pairs of highly developed wattles, a small pair on the lores on each side of the base of the culmen, a much larger pair on each side of the occiput, and an extremely long, more or less pendant, pair on each side of the throat. All three pairs of wattles are visible in the female in a rudimentary condition.

The 1st primary is very much shorter than the 2nd, which is equal in length to the 10th. The 5th is the longest in this series.

The tail in the fully adult male is composed of thirty to thirty-two white feathers, the variation in number having nothing to do with age, but being a wholly individual character. The central pairs are extremely curved, and more than twice the length of the outer pairs. On many of the latter the web is defective or absent from much of the terminal portion of the shaft, which is thickened and spine-like. In the tail of the female there seems to be always twenty-six feathers, of more equal length than in the male.

The spur is short and stout in the male, rudimentary in the female; the tarsus is considerably longer than the middle toe and claw.

LOBIOPHASIS

	Type.
Lobiophasis Sharpe, Ann. Mag. Nat. His. (4), XIV. 1874, p. 373 . .	*L. bulweri.*

The genus consists of but a single species, the White-tailed Wattled Pheasant, *Lobiophasis bulweri* Sharpe, and there is little chance that a second exists. As far as we know, it is confined to the central parts of Borneo.

WHITE-TAILED WATTLED PHEASANT

Lobiophasis bulweri Sharpe

Names.—Generic: *Lobiophasis*, from the Greek λοβός, lobe or wattle, and φασιανός, pheasant, from the very highly developed cephalic wattles. Specific: *bulweri*, after His Excellency H. F. Bulwer, Governor of Labuan. English: White-tailed Wattled or Bulwer's Pheasant. Native: Blaiou (Kayan and Dyak, Sarawak); Bau-eu (Dutch Borneo); Bagier (circa Mount Dulit).

Brief Description.—Male: Neck all around and upper breast dark crimson; remaining plumage black, all the feathers narrowly margined with steel-blue. Upper tail-coverts and tail pure white. Bare skin of head and wattles bright blue; legs and feet red. The immature male has the tail coverts and tail chestnut. Female: Brownish-buff above, finely mottled with black; lower plumage rufous similarly mottled; tail clear chestnut.

Range.—Central Borneo.

THE WHITE-TAILED PHEASANT IN ITS HAUNTS

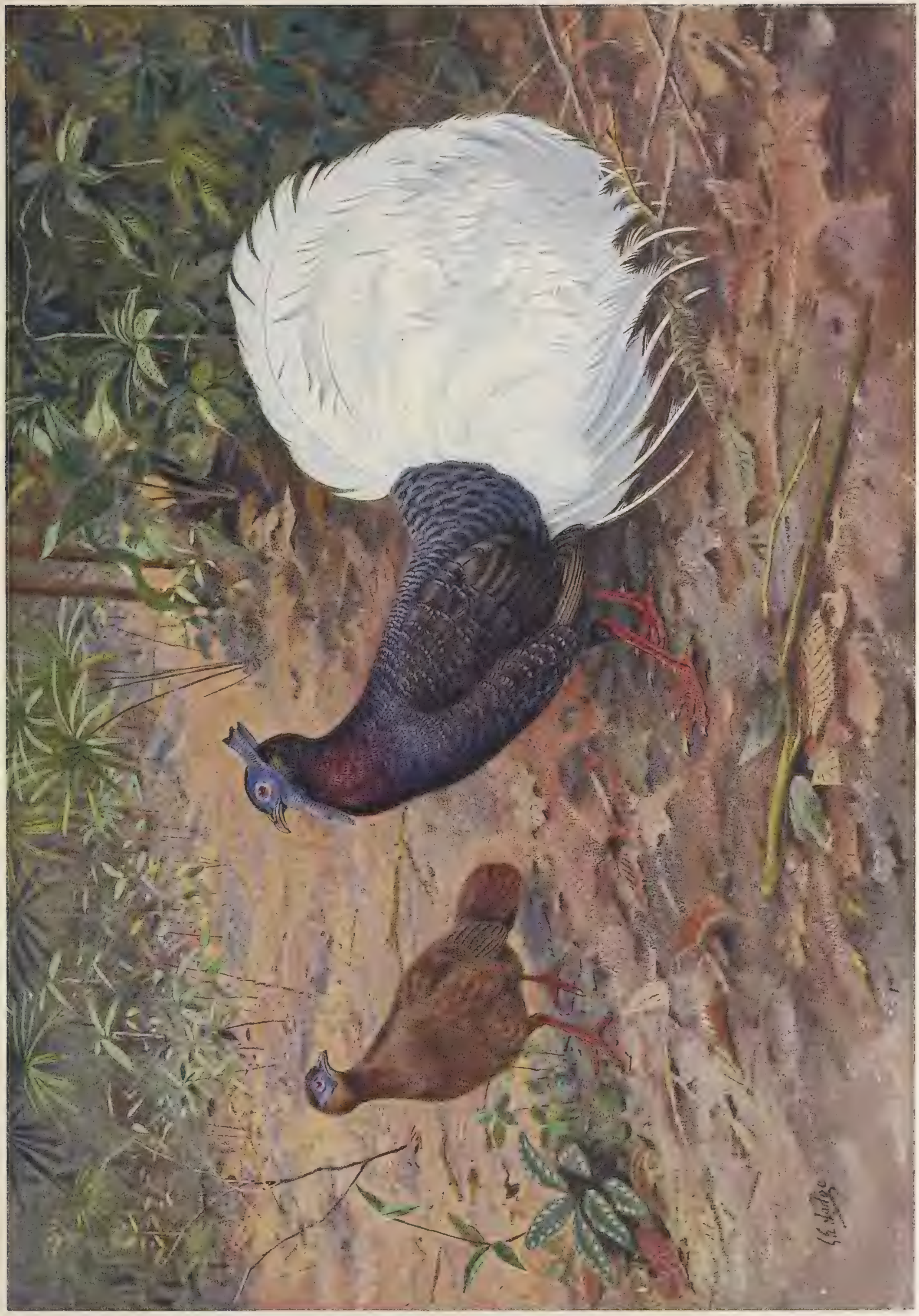
As a rule animal life is not abundant in the Bornean jungle, compared with the great primeval forests of South America. Occasionally, however, I was treated to most interesting sights, and such days will always remain most vividly impressed on my mind. Once, far up near the foot-hills of the mountains, on a tributary of the upper Rejang in Sarawak, I had pushed on around a sharp bend in the river, and was preparing to work up through the rapids ahead, when one of my Kayan paddlers said through the interpreter that he and his companions had heard of the death of a sub-chief at a village on a side branch of the river, and they would all like to go and pay their respects to the deceased—in words, half English, half Malay, to that effect. I always made it a rule to comply with all the little ceremonies of my savage helpers, and to allow any tribal customs, religious or otherwise, and in return I found they always gave me most honest, efficient service. I was rather disappointed at having to stop, but as the afternoon was half over we could not have made much more progress against the boiling, yellow rapids just ahead. So I gave my permission, and the canoes were quickly beached on a sandbar.

The Kayans with their great truncated, sword-like knives cut down the undergrowth and erected two little raised shelters for me and my Malay servants, well out of the reach of any possible sudden rise of water. Having made certain that *Tuan* needed nothing more that they could provide, they unpacked their small bundles of possessions and proceeded to adorn themselves with what pieces of black cloth they possessed, and arrayed at last, they dropped swiftly out of sight down-stream, and I was left canoeless in the heart of Borneo. I knew I could trust the savages, however, and began at once to cast about for a way of getting into the forest which began at the very bank of the river. The undergrowth was extremely dense, but at the second circling I intersected a low game-trail. I fear it was but a wild-boar path, and a "pig-high" trail was never intended for the passage of a six-foot

WHITE-TAILED WATTLED PHEASANT

Lobiophasis bulweri Sharpe

Perched in a tiny half-cave in the rocky side of a deep gorge in central Borneo, I watched the flying lizards, gorgeous as butterflies, pass swiftly from tree to tree, while long-tailed paradise flycatchers swooped after flying insects, in and out of the shadows overhead. Without warning there stepped into view three chevrotain, the tiniest of jungle deer, and with them a quartet of White-tailed Pheasants, one a fully adult male with great, spreading tail sweeping the ground. They walked slowly beneath me, and still unalarmed, passed from view in the direction of the river.



WHITE-TAILED WATTLED PHEASANT.

human being. Now semi-erect, now quadrupedal, I made my way on and on, passing for the first hundred yards through old, long-overgrown clearings. These are characterized by trees of medium size and a very dense undergrowth of rotan-like growths, spiny palms and, in every spot where sufficient sunlight filters through, by the climbing fern which raises its fronds stratum upon stratum, resting upon the stems and branches of any surrounding growths. Then a dimness settled down upon the trail, I was able to walk in a less crouched attitude, and soon the undergrowth thinned and I found myself surrounded by great mossy, lichened trunks—the remains of the primeval forest of this great island.

I turned off the trail between the low, irregular walls of a gully, down which a small brook filtered noiselessly through and over great pads of moss. Some distance up-stream I found recent evidences of scratching among water-worn pebbles and coarse damp gravel. This seemed encouraging, and as the sun was getting low I looked about for a place to conceal myself. The gully narrowed and deepened into a gorge, and presently showed where a side stream, a still finer unit in the plexus of tributaries, entered. Ten or fifteen feet from the ground I found a little half cave, in front of which leaned an old tree. The stones were quite dry, and here I ensconced myself, crushing a score of pink begonia blossoms as I wriggled in. Somewhere above me a dyal-bird was singing its sweet, long-drawn-out notes, and the steady throb of great crickets shrilled close at hand among the crevices of rocks. After a few minutes of waiting, the loud woof! woof! of hornbills' wings came up the little gorge, and several birds alighted out of sight and barked at each other for a while. Then I heard the low crackling of leaves and twigs, and to my amazement I saw cattle passing almost under me, splashing through the shallows. There were three, one a bull almost black with all four feet white, the other two being cows. I knew them for banteng, the wild Bornean cattle, and watched them pass slowly from sight with the keenest interest.

For a long time I thought that I had seen my last game. Only pittas hopped here and there, and an occasional barbet or broad-bill swooped across the space in front of me. Once a flying lizard, with wings brilliant as those of a butterfly, glided from a tree high overhead to a trunk only a few feet away, where it clung and watched me. Its tail and hinder body were pressed closely to the bark, but the forelegs held the shoulders and head at full length, while from the throat the long, conical gular pouch inflated and deflated nervously. A family of paradise flycatchers flew over, greatly excited, crests erected and scolding hoarsely. Then came the sight of the afternoon. My eyes were resting idly on the big elephant-ear leaves at the edge of the forest-trees when there stepped out the daintiest of tiny deer, a chevrotain, then another and another. After a momentary sniffing at the spoor which the greater hoofed animals had left, they stepped ahead and, close behind them, showing no fear, came four White-tailed Pheasants. There was one fully adult male with sweeping white tail, and a female, apparently its mate, while the other two were immature birds of the year. I was already flattened to the rock as closely as possible, but now I even half closed my eyes, dreading lest their sharp vision should search me out. But it was another proof of how little these lesser jungle folk, while in the forest, look for danger from above. Indeed, the slender stems of the great arum-like plants and elephant-ears could hardly support a dangerous foe, while the absence of low branches left merely the smooth or mossy trunks which gave foothold only to squirrels and woodpeckers. It was upon the surrounding jungle that they concentrated their sight and hearing, and, as in my posts of observation in the densely foliaged deodars and firs in the Himalayas, here, too, I was wholly safe from detection. When the deer and the pheasants reached the stream they all drank deeply, selecting clear pools well away from the disturbing footprints of the banteng. Never did all seven drink at once; always one or two—a chevrotain with nostrils outstretched and quivering, or a pheasant with head raised on high, each with a pair of bright, unwinking eyes. For twenty seconds at a time the male White-tail would hold such a position unmoving—a position of which it has been stated that "The picture in the 'Birds of Asia' gives a wrong idea of the carriage of the bird, and I very much doubt whether it ever sits up in the way there depicted," as if any bird whose habit it was to skulk could not as well raise itself on tiptoe to gain a wider view-point. During the many minutes which I was fortunate enough to keep these birds in sight, I was impressed most profoundly with the constant, never-failing alertness and sense of danger. I realized as never before how, in this jungle, which in comparison with South American forests seemed almost barren of organisms, life could be lived safely by these weaker creatures only by an unceasing watchfulness. Even when the birds began scratching, they were always on the lookout, and only when for a fraction of a second they snatched a morsel did they cease their watch.

I was interested to see them scratch not only in the gravel and mud, apparently uncovering tiny worms, but also in the shallows, making the water fly in all directions, and then snatching eagerly at something edible which swam in the water. Sometimes the old female would take her stand in an inch or two of water, and her two nearly-grown young would reap the benefit of her exertions, all three pursuing the minute worms and crayfish and aquatic insects; for I later found that all three groups contributed to the diet of these pheasants. The musk-deer seemed to enjoy standing with all four feet in the water, and they busied themselves not so much with browsing, as with their toilet. With their tiny hind hoofs they scratched and rubbed all parts of their head and shoulders. Perhaps leeches were tormenting them or flies had bitten them, as they did ourselves morning and evening upon the river banks. There was a very obvious association and an apparent mutual understanding between mammal and bird which brought vividly to mind the similar relation between the musk-deer and kaleege pheasants of the Himalayas. The pheasants walked in and out among the deer unheeded, and the deer, hardly a yard distant, sniffed unconcerned at the muddy water sullied by the vigorous scratching of the birds. The bonds between the various members of the White-tail family were very loose, indifference expressing the attitude, especially on the part of the parents, although all kept more or less closely together. But there was no attempt at feeding, or of any motion that I could detect, except that of tolerance as of one bird to another in a flock. The male invariably took the lead, and usually passed ahead of the others from one pool or spot of gravel to another. The deer, although they appeared first in the open part of the gorge, seemed rather to follow than to lead, and more than once passed on, following and keeping close to the vicinity of the pheasants. It was remarkable how similar had been the first glimpse I had had of the Bornean crested firebacks—feeding along a gravelly rivulet in a family group. Apart from the wonderful opportunity thus offered, I was delighted with the picturesqueness; the deep, dark gorge, with the green tangle up-stream opening into the clear space between the rocky walls. Begonias dotted the rocks, a tiny pale blue blossom covered much of the banks, and through this wild glade to see the tiny, graceful deer picking their way, and the trim, wary birds in absolute freedom, wholly unconscious of being watched, was a sight never to be forgotten.

It was all the more a remarkable sight (although later I was to have even more intimate views of this pheasant) when we read of the experiences of other observers in these jungles. Finsch says, "Bei der Undurchdringlichkeit des Dschungel ist es z. B. unmöglich die hier lebenden prachtvollen Wildhuhner (*Argus*, *Lobiophasis* und *Lophura*) zu schiessen, deren Stimme man wol hört, die man aber fast nie zu Gesicht bekommt."

So absorbed was I in not losing a movement, that I did not notice that the day was passing, and suddenly a terrific clap of thunder crashed overhead. The storm was going around, however, the black masses of cloud just visible through the trees piling one over the other. The dimness of twilight fell, but soon the wonderful Bornean afterglow changed the clouds to greyish pink and filled the whole glade with the rich rosy hue. I knew how fleeting was this last light of day, and as the pheasants had vanished, I dropped from my cave and made my way back to camp as quickly as possible, reaching my hammock just as darkness fell. I watched carefully, but caught not a glimpse either of deer or pheasants.

GENERAL DISTRIBUTION

The oft-quoted geographically and grammatically ambiguous statement that the White-tailed Pheasant is "only found on the mountains" is untrue. There is no doubt but that it does range upward on the lower slopes, and has been recorded from Kalulong, Mulu, Dulit and other mountains, although I know of no record of over twenty-two hundred feet elevation. On the other hand, it is not uncommon in low, rolling forest country in Sarawak, many miles from any mountain or range of mountains. Indeed, the natives of the lower zones are much more familiar with the *Blaiou*, as they call it, than many of the tribes from nearer the central ranges. It is extremely local in distribution, a fact for which I could discover no explanation, and in passing down a stream, bordered with homogeneous forest, the bird would be well known to the natives of one section and wholly unknown to the next few tribes, although all were skilful trappers and acquainted with all the edible pheasants and similar birds in their neighbourhood. I could find no reason for the assertion that these birds dwell always "far from water." On the contrary, during the dry season I found them invariably frequenting the water-courses, usually the larger streams and rivers, while at the beginning of the rainy season, they, together with most other jungle animal life, came less often to the river banks, finding, I suppose, sufficient moisture for their needs in temporary jungle pools.

In British North Borneo White-tailed Pheasants are not uncommon along the upper Kimabatangan River. In Sarawak, they have been found in the interior from Brunei on the north, to the mid Rejang region in the south, while in Dutch Borneo we have several records (Büttikofer), and the upper Mahakam (Nieuwenhuis). So while these birds do not apparently occur on the coast, they seem to be very generally—if locally—distributed over much of the island as a whole, more especially in the northern and central areas.

GENERAL ACCOUNT

There is no doubt that the White-tailed Pheasant is almost as particular as the argus as to the character of its jungle home. Almost all the rivers and larger streams of this region show the former occupancy of natives by the wide reaches of second growth on each bank. Even when this has grown up to some semblance of the original primeval growth, it is seldom that these pheasants are content to make their home here. They prefer the deeper, uncut dry jungle, but morning and evening they have no objection to crossing overgrown, or even cleared areas in order to reach the water. As regular as do the big game, so these birds come twice each day to drink. The argus and the White-tail will, however, sometimes return and inhabit such overgrown country if it be wholly deserted by natives, while the crested fireback seems actually to prefer such territory rather than to avoid it. Both the White-tail and the argus require rolling country, and I have never known of one of the former being found in the low, level, half-marshy regions which are the delight of the firebacks.

The first news of this little-known pheasant which I received on reaching Sarawak was that there was a live male in the possession of an American missionary at Sibu on the Rejang River. Although the few specimens in museums have been taken mostly in the extreme north of the colony—on the Baram and Lawas Rivers, I decided on following up the rumour of this live bird. When I reached Sibu by one of the little fortnightly steamers, I found that the bird had recently died, and after an attempt had been made to skin it, had been thrown away. The memory of the man who had buried it was poor, and after a thorough digging up of numerous plots of ground by sundry Dyak and Chinese convicts, we gave up the search for the skeleton.

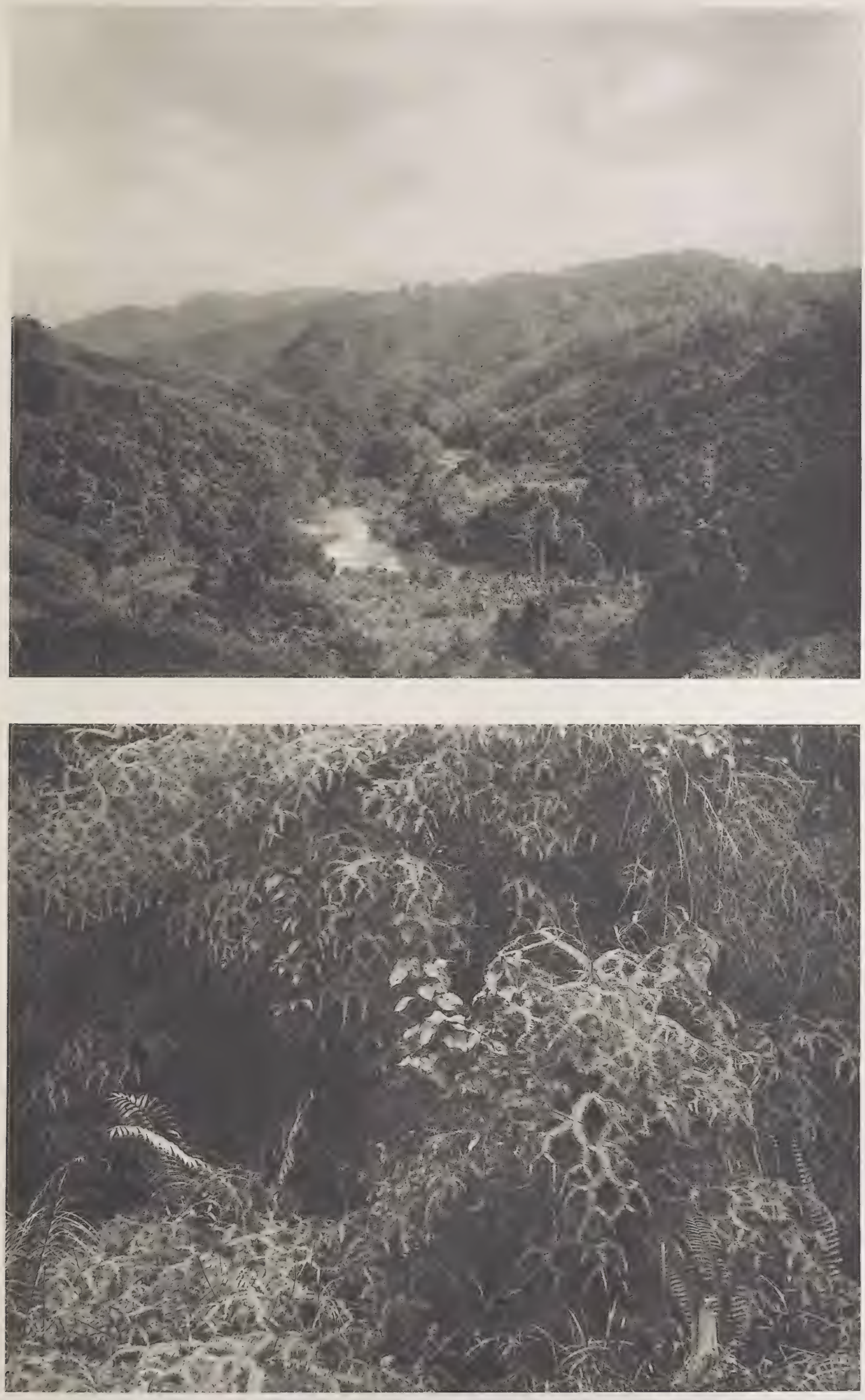
The bird had been caught by the Dyaks two days' journey by canoe up the river, so I went on to the last outstation, Fort Kapit, where I found myself just within the zone of White-tailed Pheasants. From here I pushed on in a seventy-foot canoe, and later in smaller craft up the Rejang, Balleh and Mujong Rivers, and found this species local but not rare, and distributed over much of central Sarawak, as frequently in the low-lying but rolling hilly country as near the foot-hills of the mountains. Its supposed rarity seems due to several causes: its extremely local distribution, the fear of the head-hunting Dyaks, and especially the unconquerable tendency of these natives to instantly kill and eat every animal, bird, snake or other creature which shows enough flesh to make it worth while.

One can draw a close analogy between the White-tailed Pheasant and the Dyaks themselves. Both are governed by the presence of jungle. When it is cut down and the land impoverished by a crop, the Dyaks move on up-river to more primitive jungles. The White-tails prefer the open undergrowth of the older forests to the dense thorns

BORNEAN HOME OF THE WHITE-TAILED WATTLED PHEASANT

On the slopes of the rolling hills of central Sarawak, in the warm jungles, sloping down to the yellow rivers, these magnificent pheasants have lived for untold centuries. Only by days of the most patient watching can they be seen, and more often a fleeting glimpse is all that rewards a painstaking stalk.

Beneath the tangles of soft-fronded climbing ferns, or the solid phalanx of bamboos, the birds may remain hidden a few yards distant, and never be discovered. The young birds are less wary, and, trusting more to their inconspicuous colouring, often come into more open spaces, to scratch for food or to preen their plumage.



BORNEAN HOME OF THE WHITE-TAILED WATTLED PHEASANT

of second growth, and so keep just ahead or inland of the devastating path of the Dyaks. Both seem to cling closely to the rivers and creeks. Away from these aquatic highways one may travel for many days and meet neither pheasants nor men.

My first meeting with the living White-tailed Pheasant gave me an idea of the keenness of observation of some of the Dyaks. On July 12, 1910, I sent my Eurasian taxidermist and collector on up-river to interest a distant village of Sea-Dyaks in trapping *Blaiou* for me. I had collected several argus and fireback pheasants, together with a zebra civet and a "moon rat," and was engrossed in preparing these specimens, when two little Dyak boys came to the camp carrying a wicker cage. I gave but a glance at the birds through the small interstices, and seeing what I took to be a pair of immature crested firebacks, I refused to purchase them, especially as they wanted an outrageous price. They carried the birds away, but while I was at tiffin they returned with a Dyak from the nearest village, who said the birds were "*Blaiou* wives." I laughed at this, but looked again at them, and a glance at the ventral surface showed that the savage was right and that they were undoubtedly immature male or female White-tailed Wattled Pheasants. The three pairs of wattles were plainly distinguishable, and the paleness of the head left no doubt. One of the birds, a young female, soon died, but the other lived, was perfectly tame, and for weeks thrived on its paddy. Indeed, I was able to ship it from Singapore in good condition, and it lived on board ship until within sight of New York City.

From this time on we had no trouble in collecting adult and first-year birds, but in several weeks' search observed no individual in the chestnut-tailed plumage of the second year. In July the pheasants were all moulting heavily, and they showed no signs of a recent breeding season. Indeed, the age of the immature birds indicated that the nesting season, at least for these individuals, is about April in this part of Sarawak.

The White-tailed and argus pheasants living, as I have said, usually in the vicinity of the larger rivers and streams, may be found in the first, or at most the second line of hills stretching back from the banks of the upper reaches of the rivers. Their regular habit of leaving these dry, hilly jungles and making their way to the water to drink morning and evening, unfortunately facilitates the trapping of these splendid birds. The Dyaks cut a line of dense underbrush and pile it along a ridge of hills parallel with the river bank, packing it closely, fence-like, uphill and down, winding along for a half or even a whole mile. Every ten feet or thereabouts a converging semi-circle of bamboo-sticks leads to an opening in this brush fence, and in this is spread a noose attached to a bent, living sapling. Each Dyak in some of the villages has from twenty to eighty of these traps, and goes his round every morning. If the birds are not promptly found and removed, they are invariably devoured by civet cats, although these creatures themselves are often caught, together with binturongs and porcupines.

Practically nothing is known about the nesting habits of this pheasant. Three Dyaks of as many different tribes assured me that it laid only two eggs, and on two separate occasions I saw what was very apparently a family of four—parents and two young, so that some measure of credence may be given to this number. The only egg of which I have knowledge is the one said to be of this species collected near Mount Dulit on the Baram River, Sarawak, in September, by A. H. Everett, and now in the

British Museum. It is a regular broad oval in shape and of a pale pinkish cream colour, being thus hardly distinguishable from the egg of the Bornean crested fireback. It measures 51 × 40 mm.

It is but a truism to state that these pheasants are skulkers and runners rather than fliers. What ground bird whose home is amongst jungle undergrowth could be aught else? When approaching these birds with the greatest caution I have very often been able to catch a momentary glimpse of them, the white tail of the male advertising him at once. When several of both sexes were together it was the males which first fled, the brown immature males and females delaying to have a second look at me, and then usually disappearing in a different direction. If when all had vanished I squatted and remained motionless, in ten or fifteen minutes I would hear what I judge is the covey call, a penetrating, rather metallic, *kook! kook!* uttered by both sexes. This would invariably become subdued by distance, the birds evidently converging at some far-off spot. But if the first place of meeting with the birds was a favourite feeding-ground, as evidenced by the abundant signs of scratching, one might be reasonably certain of seeing the birds at the same place on another day. Only in the morning or toward evening, however. Search as I might, I could never discover a single individual at other times of the day.

The natives, both Kayans and Dyaks, told me that the birds had regular roosting-places, and that they set their snares about these trees. One young man—a "grey Dyak" as I called him, as he was one of those whose skin from head to foot was like grey powder, a common uncontagious disease among these people—undertook to lead me to one of these roosting-places. After a toilsome tramp of several miles through the low jungle we came to a series of steep hills, and near the summit of one of these elevations my guide suddenly stooped and picked up a tuft of feathers and part of the foot and leg of a White-tailed Pheasant. The bird had been caught in a snare which now dangled overhead from the tip of a sapling, and had been devoured by a zebra civet, so the Dyak said, indicating the species of the marauder by pointing to the bit of skin dangling at the back of his loin-cloth. A few paces farther he pointed to the ground, where there was abundant sign, showing that some good-sized bird or birds had been accustomed to spend the night in the branches overhead. The tree was slender and very smooth barked, and it stood quite isolated, its branches free from contact with those of the surrounding growths—a well-chosen roost for protection against night attacks. I asked the Dyak later how he discovered and recognized such roosts, and his answer was that the finding was by accident, but that such sign on a steep hillside could be made only by *Blaiou* or *Ruoi*—the White-tailed or the argus, but that the latter never roosted in small trees, only in large ones.

The spurs of the male White-tailed Pheasants are moderately developed, so that a certain amount of pugnacity is implied. Hewett states that they "are very pugnacious, and that their heads are consequently often raw and scarred, while they would attack any other birds put in their cages." I saw no evidence of the scarring on the face and wattles of the birds which came under my observation, and those which I had in captivity were gentle, although it is true that they had no opportunity to attack birds other than their own species. I suppose that as it was not the breeding season they were quieter than they might have been six months before.

It is probable that the breeding season of these pheasants is rather elastic, and, like most tropical birds, may in different localities extend over a good portion of the year. Certain it is that in July in Sarawak I obtained birds of five or six months of age, and during the same week saw a pair of adult males sparring with one another and assiduously courting a female. This was the most important observation which it was my good fortune to make concerning these pheasants in Borneo.

Instead of sunshine, or at least a thin haze of clouds during the day, balanced by a terrific downpour of driving rain throughout the night, the reverse one day took place, and after I had made an early start and was several long miles from camp, a sudden deluge descended upon me, and in a few minutes I was thoroughly drenched. I was encumbered with nothing but my stereo glasses, as I had planned a day of pure observation. Plodding on through the dripping undergrowth I came to where a great tree had fallen—a tree whose life must have stretched back well beyond the time when white men first set foot in Borneo. It had been strongly buttressed in all directions, but a stroke of lightning had run down the trunk and splintered one of the great basal supporting walls of living wood, and thus unsupported, the mighty mass had given way. It had cut a wide swathe for itself, carrying down all the lesser growth in its path. Under the shelter of two of its remaining upreared buttresses I found ample protection, and here I remained for many hours watching the jungle life of a rainy day. None but small folk came near, however, until well after midday, when the sun at last broke through, although the saturated forest continued to rain down drops for many a minute after the whole sky above had cleared. The first intimation I had that pheasants were about was a sharp, nervous *kak! kak!* which came from the other end of the mass of shattered foliage. By slow and painful manœuvring I was able to peer out unseen and to detect a male White-tail stalking slowly along at full height, concentrating his attention upon a clump of maroon-leaved plants near by. Whatever it was which had excited his interest or suspicion he was soon satisfied that all was well, and he began feeding unconcernedly, scratching in the mould, or now and then picking some insect from a leaf. For seven or eight minutes I watched him, and at last dared to shift my glasses and rest them upon a ledge of bark, so that I was able to see even the contraction and dilation of his pupil as he remained motionless for a moment. The splash of falling drops, the twitter of small flycatchers, even the sudden, wholly unexpected and startling notes of a barbet did not distract his attention a moment. But always he was alert, always a momentary snatch at some morsel of food was followed by an instant of concentrated listening, a quick, comprehensive glance which took in all the adjacent shrubs which might shelter a foe.

A change at last came over him; without seeming alarmed, his attention became focussed more and more in a particular direction. Straining all my senses, I could neither hear nor see anything—but he knew of something which was as a fourth dimension to my dulled faculties of perception. Finally the bird ceased all attempts at feeding and stood immovable, never taking his eye from the edge of the jungle. At that exact spot, after several minutes of further waiting, a pair of adult White-tails emerged rather precipitately, the female first, as if the male had been pursuing her. On the instant both caught sight of the waiting bird, and both uttered a low, startled *kak!* In a moment, however, the alarm passed and the female came diagonally across the clear space, taking ants or other insects from leaf or ground as she came. The male birds stood for some time apparently watching one another, then my pheasant began approaching the female with quick, short steps. A moment later and the second male drew slowly nearer. I was breathless with excitement. My mind ran over the few meagre padded lines which represented our knowledge of these wary birds, and here the good fortune of the unusual diurnal rainfall had given me this wonderful opportunity. The second male approached steadily and slowly, with no noticeable change in his demeanour, but my bird became more and more excited as he neared the female. His wings were slightly lifted from the sides of the body, although the fluffing out of the plumage left no space beneath them. The head was well up and drawn back, the wattles seemed very much elongated, but a careful look through the stereos showed the wrinkles still evident, the apparent enlargement being due to the straightening of the occipital and gular pairs, so that they no longer hung flaccid and limp. Now the bird came close to the little brown hen, who edged away but without showing alarm, and the moment for which I had been waiting came at last. Two complete turns my male made around the hen, circling her irregularly but completely, his attitude being a stiff strutting with his magnificent tail spread to the full. It was a lateral display, and yet I could detect no depressing of the plumage on the side toward the object of his emotion nor yet an elevating of the feathers on the farther side. The bird simply progressed evenly, symmetrically, head pointing forward, but the tail-feathers forming almost a semi-circle of immaculate brightness. High over the back curved the inner, wide-vaned plumes, almost touching the upraised neck, while the remaining pairs arched around down to the very feet, in fact, again and again they were pushed forward, actually concealing the scarlet legs. The gait was peculiar, a few quick steps, then immobility and a statuesque pose, again the few steps and again the hesitancy.

At each rest the bird seemed to become actually larger, the feathers of the body fluffing out so evenly and slowly that one could not avoid the idea of solidity. Simultaneously, the skin of the face seemed to puff out, although this appearance may have been caused by a change in colour intensity. But there was no question as to the muscular extension of the wattles; they visibly lengthened, rather spasmodically, reaching their greatest extent at the moment when the bird ceased its walk. I would place this extreme distention at about half the length again of the retracted organ. This fact observed, I centred my attention upon the tail, and when the bird slowly turned away from me I saw that the outer feathers were spread well apart as well as downward, so that from the rear view it appeared as if the bird were walking between the opposite sides of its tail. The normal carriage is with the opposite sides of the tail closely appressed at a very acute angle; at this time the posterior view showed them spread widely at the base—tent-like. As the feathers pushed forward or were relaxed an audible rustling was produced, and when the bird passed over dried leaves this sound increased; at times there were a dozen or more leaves literally *raked up* by the stiff, recurved outer quills of the tail-feathers. The supreme moment came when the hen stopped for a moment and her suitor halted squarely in front facing her. With what wattle or tail accompaniment this new, supreme phase would have been enacted I shall never know, for male number two now approached, and both at once rushed at each other with half-spread wings, and for a moment pecked viciously, but showed no inclination to use their spurs. Then the *zeitgeist* of the jungle, in its mysterious way sent forth to these wild creatures the knowledge of danger, and with a single impulse all three fled, my friend in one direction and the others near where they had emerged. There was no apparent choice of companion or direction—the birds simply ran swiftly for the nearest shelter, heads outstretched, tails low and close shut, the male as different from his courtship attitude of a minute before as can be imagined.

Thus passed my only opportunity for observation of the intimate life of these splendid birds. This was sufficient, however, to confirm my suspicion that the worn and abraded condition of the tail-feathers was not due wholly to congenital defects. Judging by the recklessness of passage over sodden leaves, twigs and irregularities in the debris of the jungle floor, which I observed during the courtship, it is only remarkable that anything remains intact but the abraded stumps of the outer tail-feathers. I have discussed the interesting correlation between the inherited defective condition of the rectrices and this ontogenetic abuse of these long-suffering feathers elsewhere.

What I saw of the courtship of the White-tailed Pheasant leads me to think that the general method at the start is a lateral, asymmetrical display, but the finale is as certainly frontal. Whether the tail at such a moment is spread outward, so as to form a white background, must be left to conjecture. If so, the courtship as a whole is quite similar to that of the peacock pheasants. The short and indecisive combat which I witnessed was suggestive only in the fact that no attempt was made to use spurs, and this, taken in connection with the extreme variation and at most only moderate development of these organs, would indicate that the White-tails are much less given to fighting than the terribly armed fireback pheasants.

As to the food of the White-tailed Pheasant, from examination of the crops of recently killed birds, I found that they were equally insectivorous and frugivorous. Ants formed by far the dominant item in their diet, a small black species being the most abundant, while small crickets and other orthoptera were also not uncommon. Termites were second in point of numbers, and twice I actually saw the birds feeding about the earthen tunnels of these so-called white ants. Minute round black seeds, and large pieces of some fruit of a nut-like consistence were also a favourite article of diet. The Dyaks called this *cacos*, and said it was not edible for man. These natives were also unanimous in saying that when a certain fluviatile fruit became ripe, these pheasants and many of the smaller mammals came to the river banks in much larger numbers than usual for the purpose of feeding on this dainty. I could discover neither the fruit nor the trees which bore it.

Until we know far more than we do at present concerning the causes of the colours of organisms, we can do little else than narrow down the various questions and theories by the process of elimination. In the White-tailed Pheasant, for example, we have a bird which spends its life in the dense jungle, among thick underbrush, where the light is constantly dim and shaded. No one will dispute that the sombre colours of the female are protective among such surroundings, and even the more conspicuous second-year male, with his blue-edged body pattern and chestnut-tail, would merge with almost any situation in these tropical forests. But for the fully adult bird we can find no such background. Shining white spots of such size are not scattered about upon the jungle debris, and whether stalking beside a brook in an open glade, or half-hidden by climbing ferns, the White-tailed Pheasant in the glory of his full beauty is striking and conspicuous anywhere. Twice I had opportuuity to see both males and females alarmed, and both times it was the white-tailed adult which fled first; swiftly, without a backward glance or hesitation; the duller individuals waiting a moment to see if the danger was imminent. Once a solitary female squatted for an instant, before my hand touched a twig and sent her too flying headlong, threading the fern-stems as if they were no obstruction. This is the best proof we have, and I consider that many of our ultimate conclusions must rest upon just such evidence. The realization of danger is most acute in the bird whose plumage is inevitably conspicuous; the sense of trust to assimilation with the surroundings—wholly instinctive though it be—indicates with absolute certainty that many, many times such behaviour had enabled the little brown hen to escape observation. The red eye, feet and legs and purplish wattles detract, if anything, from the general conspicuousness of the pheasant. There are myriads of red or pink or purple jungle shades—dead or insect-eaten leaves, lichens, fungus, moss, bark, begonia stems, and scores of other unnamed and unnameable. But as for the flaunting white tail, that splendid badge of reward for three years' successful striving against the thousand and one forest dangers, it mimics nothing, it flares out like a heliograph; the brave owner finds his food, his mate, and lives his life in spite of it, with only his keen eyes and ears and his swift scarlet feet as counter-balancing assets.

And how little all these count for when pitted against the native savages. The rainy season has come to an end—the jungle pools are dried up, and every day the White-tail must make longer and longer pilgrimages to the low-lying marshy country. One day he turns his steps toward the river itself, walking steadily over hill after hill, at last turning into a narrow valley. Halfway down a pile of brush obstructs his path, and strive though he will, he can find no way past it. A few yards farther and an opening appears, just wide enough for him to step through. His scarlet toes press upon the loose bamboo sticks lying at the mouth, there is a sudden snap, the whole world revolves and high in the air the splendid bird dangles, swaying back and forth from the bent sapling. Perhaps death comes swiftly from a passing civet cat, perhaps the following morning the Dyak trapper goes his rounds. But no matter whether soon or late, the days, months, years of watchfulness, from the chick which crouched and watched the civet slink past, to the white-tailed bird which yesterday out-saw and out-ran the swift-footed moon rat itself—all have been in vain. The Dyak squaw strips the shining plumage from the body, or sells it for a few beads to a passing Chinaman; the White-tailed Pheasant has run its race.

CAPTIVITY

The first knowledge we have of these birds in captivity is of the pair which were sent to Sourabaya, Java. The male died in that island, but the female reached the Amsterdam Zoological Gardens, being so weakened by the journey, however, that it lived only a few weeks. Treacher says that he found difficulty in keeping these pheasants alive, but Hewett's experience was otherwise, as he tells us that they thrive in captivity on paddy, boiled rice and fruit. He goes on to say, however, that he could never keep any of the hens alive, as they refused food and seemed to mope, and would die in a day or two. The hens I had in captivity were, on the contrary, more gentle and ready to feed than the cock-birds, and it was a hen which lived on board ship from Singapore until actually within sight of the harbour of New York. Such isolated and conflicting experiences are of little value in forming any opinion, and doubtless represent merely individual physique or temper on the part of the birds. It is my opinion that when a systematic attempt is made to procure a number of these birds alive, they will be found to be no more delicate than argus pheasants.

DETAILED DESCRIPTION

ADULT MALE.—Feathered parts of head and upper neck dull black, with slight steel-blue terminal margins. Chin and throat thinly feathered, plain black. Neck all around and breast shining crimson, most of the feathers with a narrow steel-blue margin. A typical feather from these areas is divided into three equal parts, the basal third of fluffy grey down; a middle third of normal black vane, and a distal third of shining crimson. At the beginning of this latter area the barbules become very abruptly shortened, lose all trace of barbicels, and throughout its length are so imperfect and minute, that to the eye the shafts of the barbs appear bare. At the very tip the barbules are slightly longer, forming the exceedingly narrow terminal steel-blue band.

Posterior to the neck and breast (and also somewhat with advancing age) the crimson disappears apparently rather abruptly, the dead black mid-area pushing up and taking its place, while the steel-blue band widens — this being the general character of all the body plumage, except that the blue terminal band is absent from the primaries, and outer secondaries together with their coverts, the abdomen, thighs and the extremely short under tail-coverts. The steel band is much narrower on the ventral than on the dorsal plumage.

The primaries are dark brown, not dead black, and in a considerable percentage, more than forty per cent., of wild shot birds, they show as an interesting variation the presence of more or less white. This may be present on as many as nine of the primaries, occurring chiefly on the basal third of the feathers. This colour is usually quite pure on the outer two or three feathers, but becomes mottled and clouded with dark brown as we pass inward. It is rather asymmetrical in occurrence in the total amount on each feather of a corresponding pair in the two wings. None of the adjoining coverts, either upper or lower, show any traces, and indeed the majority, some sixty per cent., of the adult males which I have examined show no trace whatever of this alar-whitening. Nevertheless, its occurrence again and again in birds collected in different parts of Borneo stamps the character as one, while wholly individual, yet in no sense pathologically albinistic; very probably correlated in some way with the white colour of the tail-feathers.

I have said that the disappearance of the crimson is *apparently* abrupt, because this is true only from a superficial point of view. The crimson persists on almost all the body plumage, much darkened, however, and purpled by the encroaching black. A feather from the mid-back shows a shining blue terminal band of 5 mm. in width. This exhibits the peculiar wrinkle or upward bending of the vane which I described in *Lophura*. Bordering on this blue band is a well-marked zone of dark purplish-crimson, which merges into the proximal dull black.

The change in colour of the crimson zone is most interestingly correlated with a corresponding alteration in structure. The barbules are almost as short as in the pure crimson nuchal region, but with the blackening of the bright colour barbicels appear, and throughout the entire area from four to six of these tiny hooklets are present on every barbule. Thus the barbs of this zone tend to cohere to one another, while the shortness of the barbules results in a much closer approximation of these barbs than usual. This results in a springing apart of the web in a number of places, and produces the curious split-up appearance of the feathers of the White-tailed Pheasant, a character I have observed in no other bird. The terminal part of each feather is usually split apart into eight or ten divisions, each consisting of a greater or less number of barbs very closely cohering to one another.

The feathers of the rump are short and truncate, very sharply set off from the upper tail-coverts. These latter are long, somewhat curved and pure white, so that in both form and colour they resemble the tail-feathers themselves.

As the tail of this unusually interesting pheasant is its chief glory and the most specialized in colour and number of feathers of any tail in the family of pheasants, it is well worth considering in some detail. In the fully adult male the entire tail is pure white, and at this age the usual, normal number of feathers—certainly the maximum number—is thirty-two, just *twice* as many as in the somewhat allied genus *Lophura*. It is not often that the complete number is present, one or more usually having been pulled out in some way. After very careful examination of the roots of the tail-feathers and the surrounding skin by the complete relaxation of many adult male birds, I am convinced that it is not uncommon for thirty to be the total number. It is a very easy matter to detect the location of missing feathers, and in a number of cases where thirty feathers were present, or that number as represented by the total number of follicles, I have satisfied myself that there was absolutely not a single feather missing, nor any additional unoccupied follicles. In such a specialized organ as the tail of this pheasant such variation is surprising, and is of especial interest in view of the variation in number of rectrices in the species of *Crossoptilon*. Thirty-two, however, may be taken as the maximum, usual number of tail-feathers in the adult male White-tailed Pheasant.

As we shall see, the number of rectrices in the chestnut tail of the second-year male is twenty-four, so that in the succeeding or third annual moult there is an increase of eight feathers. When the tail of a freshly killed pheasant is spread widely the feathers seem to be in quite regular alignment, but as the tail is allowed slowly to close, an irregularity becomes apparent, and we find that this occurs solely among the central eight or ten pairs. Comparison of fully adult birds with those in the chestnut-tail plumage, and of individuals moulting from one to the other show clearly that the additional tail-feathers are all more or less central and make their appearance anterior to the regular line of rectrices, sometimes forcing these out of alignment. In other words, the additional feathers are derived from the distal row of upper tail-coverts, lengthened and coloured to similate rectrices in the third annual moult. Indeed, as we have seen, even the remaining lesser and median coverts are all affected by the same tendency, and completely isolated by form and colour from the feathers of the rump. I shall speak further of this transformation when describing the second-year plumage.

Specialization is not confined to the number of rectrices, but has very noticeably affected their structure. The vanes of all the feathers, while to a certain extent normally cohesive, yet show a downy character and softness of texture wholly incompatible with any great usefulness in flight. One can see at a glance that the tail is avowedly an ornament, with but slight power to perform its more normal function of a rudder. Beginning with the central pairs the feathers show splendid wide, symmetrical webs, and are similar in character for the inner nine or ten pairs, gradually, however, becoming less curved. The outer six, or almost invariably seven pairs become, quite abruptly, very different in character. They show almost no curvature, the outer five pairs being quite straight, the outer webs becoming exceedingly short, and although the feathers rapidly decrease in length toward the outer pairs, yet the shafts of all are much enlarged, stiff and spine-like. The most interesting character is the degeneration of the webbing on these outer seven pairs. This is faintly indicated on some of the more central feathers, whose tips may be rather worn and frayed for 20 mm. or more, but on the outer, stiff-shafted feathers it reaches an extreme. Long before I observed the courtship (p. 154) I suspected that some such manœuvring must take place to account for the worn and broken condition of the tips of the outer quills, but in the case of this pheasant (as I have shown in the racket tails of the motmot, "Zoologica," New York Zoological Society, No. 5, 1910, p. 141), environmental manipulation only goes hand in hand with congenital structure. There is great variation in this congenital weakness of the web or in its complete absence. In an unsheathed feather sprouting among these outer rectrices, the shaft may be wholly bare for 20 or 30 mm., followed by an equal area of strongly attached barbs. Or the web may be present for a third of the length of the feather and complete down even to the barbicels, and yet its point of attachment near the shaft so weak that the whole vane tears away with the removal of the enfolding sheath.

In the full-grown outer tail-feathers of the pheasant, examined in the living bird or in a recently shot or trapped specimen, we find the inner web fully developed, while the outer is very greatly reduced, up to the very root of the rachis. This reduction occurs in two decided nodes or steps. Taking the average of a score of adult males, it is first especially noticeable on the fifth from the outer pair where (all measurements are 125 mm. from the tips of the feathers) the outer web is 12 mm. in width as compared with 25 mm. on the sixth pair of feathers. On the fourth pair, the outer web narrows suddenly to only 4 mm., and from this the narrowing is very gradual down to 2·5 mm. on the outer pair of rectrices.

On the terminal portion of the outer feather a most dishevelled and imperfect condition of the vane is found. Usually, for the length of 80 to 100 mm. from the tip, the shaft is entirely bare, while beyond this point the web, both outer and inner, is broken by bare patches and is generally mussed and wrinkled for often half the entire length of the feather. The frequent bending or breaking of the barbs midway of their length is explained by the occurrence of numerous fault-bars on these outer feathers. The tips of the longest tail-feathers—the sixth and seventh from the outer pairs—are frequently themselves bent or broken, and all the shaft tips are soiled and unsightly. Not only are the shafts of the outer rectrices exceedingly thick and strong, but they have actually downward curving tips—almost woodpecker-like—curving in the direction from which the friction and attrition against the ground and leaves must come. From the sixth pair inward this character is wholly lacking.

When the scattering of barbs left here and there in the heart of the denuded area is examined, the congenital weakness is plainly evident. It is a constricting or rather flattening of the extreme base of the barbs, together with the loss of all the barbules at that point. In every way it is directly comparable with the corresponding phenomenon in the freshly-grown central rectrices of the motmot.

There seems to be some grounds for supposing that in these pheasants the absence of pigment in the tail-feathers is at least indirectly correlated with the downy character, and perhaps a tendency to basal weakness of the barbs, for in many specimens of the Malayan crested fireback the central rectrices show a very similar denudation of the shaft, not extending beyond the white area which includes the entire webs of the two central pairs and the inner web of the third.

Even in the chestnut rectrices of the second-year male White-tail, the phenomenon is foreshadowed, the outer webs of the outer one or two pairs of rectrices sometimes showing considerable denudation, while the tips of several of the feathers may be bent or broken.

In the tail of the adult male White-tail, the seven external pairs of rectrices seem to be much more intimately connected with the complicated caudal musculature than the succeeding inner ones, the relation being especially close with the depressing muscles. So it seems certain that this structure is connected with the greater wear and tear which the congenitally weakened webs of these feathers invariably show, causing them to be more active in the downward and somewhat outward spreading which is a feature apparently of both challenge and courtship.

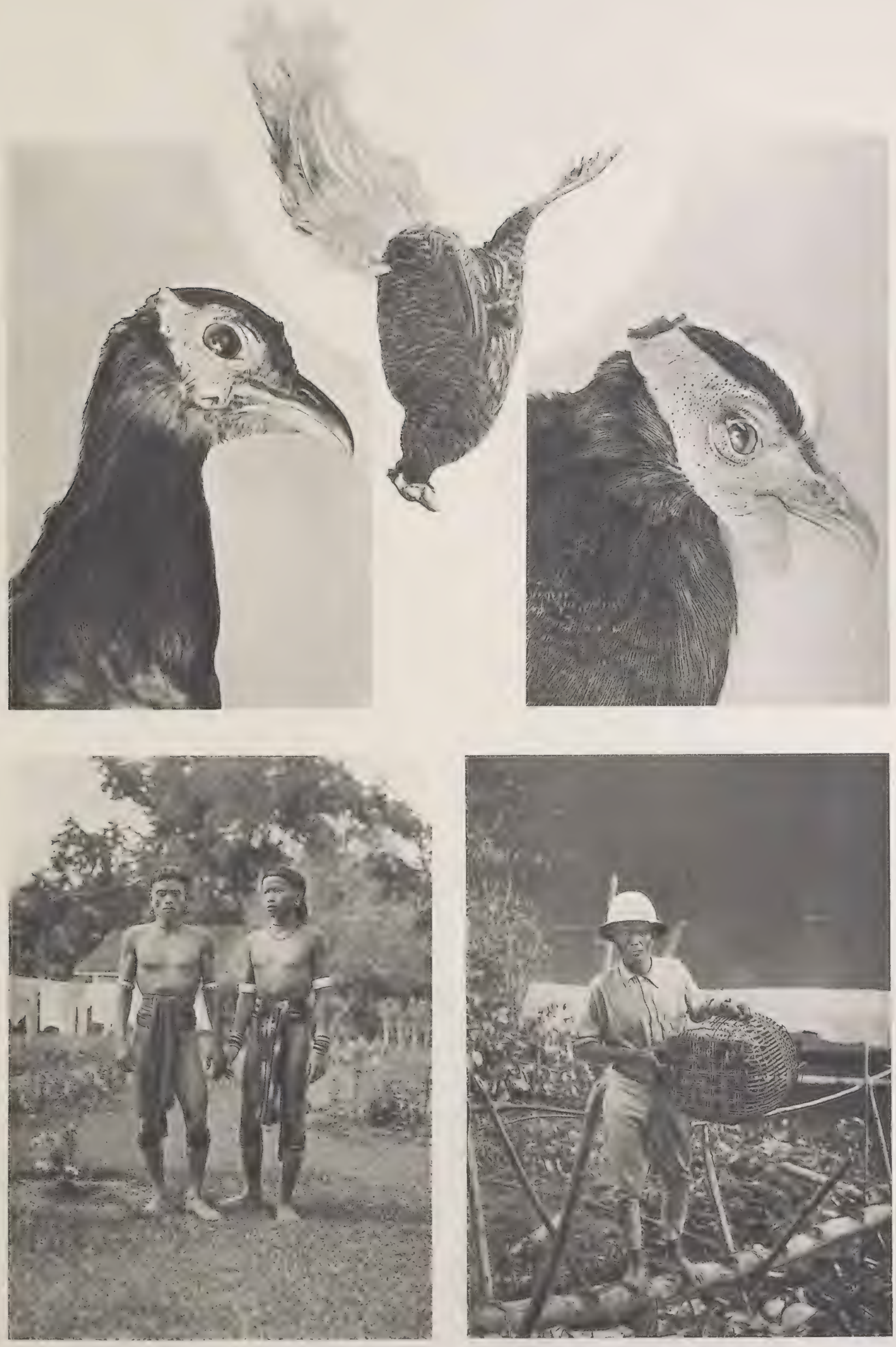
Face and bare skin of the side crown bright purplish-blue, duller on the wrinkled retracted wattles. Skin of chin, visible through the scanty feathering, back to the base of the gape, pink. The two anterior pairs of wattles are pointed; those on each side of the occiput are bifurcated, this terminal area being distinctly dark in colour and of a wholly different structure from the rest of the wattle. The wattle as a whole consists of transverse bands of smooth blue skin, which wrinkles closely together. The bifurcated black tip is covered thickly with small and irregular papillæ. The irides are very deep, strong carmine; legs and feet carmine, less intense than the eyes.

Mandibles black except distal half of lower and the tip of the upper mandible, which are pale horn colour. Weight of an adult male 2¾ to 3¼ lbs. Length, 790 mm.; bill from nostril, 21; wing, 260; tail, 460; tarsus, 92; middle toe and claw, 63. The spurs of this pheasant are comparatively short and weak, but exceedingly variable in

WHITE-TAILED WATTLED PHEASANT

In the immature White-tailed Pheasant (left) the wattles are short and inconspicuous. In the adult (right) they are long and wrinkled, and at the moment of courtship capable of being considerably elongated.

The head-hunting Sea Dyaks of Sarawak are splendid hunters, and will spend days and nights stalking and trapping pheasants and other birds. With the crudest kind of traps they would capture the birds alive and bring them to me unharmed in wicker quakes.



LIVING AND DEAD WHITE-TAILED WATTLED PHEASANTS.
DYAK HUNTERS AND TRAPPERS.

size. In fully adult males they vary from 7 to 10 mm., while in several birds of the same age I have seen them merely undeveloped flattened nodules.

There has been much misconception as to the length of the wattles, both in their retracted and extended condition. I have examined living adult males carefully when they were in a state of emotional rest, and then seen the wattles somewhat extended when the birds became alarmed. Again I have seen the wattles still further lengthen when two males were beginning to show off before a female, and finally, after manipulation of the wattles in both living and freshly-killed birds, I realized that the amount of possible lengthening and expansion has been greatly exaggerated. In the Museum in Kuching, Sarawak, are two adult male White-tails said to be mounted by Hose. The wattles of these birds have been stretched to their utmost while pliable and pinned in this position, thus giving a most remarkable appearance to the head. After watching the movement of the wattles in live birds and dissecting the musculature in dead specimens, I am certain that any such extension as the taxidermist has produced in these cases is wholly false. I give in tabular form the wattle measurements in millimetres of these falsely-stretched ones; of the natural normal length of the retracted wattles, and of what I consider to be the greatest length possible when the bird is showing off before the female.

	Artificially stretched	*Normally retracted*	*Normally extended*
Loral	17	6	11
Occipital	90	13	24
Gular	107	32	56

Thus the bird is unquestionably able to increase the length of its wattles nearly 100 per cent. in the case of all three pairs.

ADULT FEMALE.—Entire upper body plumage brownish-buff vermiculated with black, except on the hind neck, where the feathers are almost wholly dull, brownish buff. The wing-coverts are slightly more rufous. The black secondaries have very coarse vermiculations in the form of numerous wavy, oblique lines of a conspicuous rufous buff colour on the outer web and a very indistinct dim rufous on the inner. The primaries are sometimes indistinctly mottled with rufous buff on the outer web, or they may be plain rufous brown on webs. The upper coverts and tail are rich chestnut, sometimes irregularly mottled with black, more rarely plain chestnut. The tail is paler beneath, with very conspicuous brownish-white shafts, while the usual number of rectrices is twenty-six. Chin and throat whitish, shading into yellowish buff on the side and lower neck. Under-parts quite uniform, pale rufous buff, faintly mottled with dark brown. The pale brown shafts are quite conspicuous. All three pairs of wattles are clearly distinguishable in this sex; the loral as minute nodules, the two other pairs as short flaps about 3 mm. in length. The occipital pair show no evidence of bifurcation. The spurs are sharp-pointed but minute. Facial skin clear blue; iris, legs and feet bright red; mandibles black, the tips paler horn colour. Weight, 2½ lbs. Bill from nostril, 19 mm.; wing, 230; tail, 175; tarsus, 70; middle toe and claw, 50.

CHANGE OF COLOUR IN ADULT MUSEUM SPECIMENS.—The adult White-tailed Pheasants undergo considerable change in colour in the course of years even in dark skin cases, but more especially when exposed to the light for the same length of time. A male bird which has been mounted in the Sarawak Museum for twenty years has all the dark brown primaries and coverts and the black ventral plumage changed to pale brown, the shafts keeping much lighter than the vanes. The upper plumage has held true, but the black feathers of the head and neck have turned as light brown as those of an average female.

The photochemical changes which have taken place are even more extreme in the plumage of a mounted female. In a bird which has been exposed to only a moderate amount of light for about eighteen years, the head and neck have become quite white, basally somewhat mottled with brown, while all the upper plumage has become extremely faded on all the uncovered portions of the feathers. The exposed parts of the primaries are a dirty white, and the two or three pairs of central rectrices, which are marred by numerous fault-bars, are irregularly whitened in the vicinity of these imperfections. In both this mounted specimen and in skins which have been kept in light-tight drawers, the blue facial skin of the females has given place to a fleshy tint which would readily be mistaken for a faded red. The entire aspect of the birds is changed, and when we remember the similar case of a radical alteration in the female type of *Gennaeus melanonotus* (p. 39), we should realize the danger of naming species from old skins, and should constantly keep in mind the danger of possible photophobic plumage in using old type specimens for purposes of comparison.

Natal Down.—The chick in the down bears a striking resemblance to the young of the Bornean crested fireback, except that the general tone is warm rufous instead of darker. The upper parts are rich rufous, brighter on the head; the face and under down whitish buff, with a black bar through the face and an indistinct wash of warm buff over the breast.

Juvenile Plumage.—Here, too, as the dominant character, we find the pair of sub-terminal black ocelli which is so pronounced in the corresponding plumage of the species of *Lophura*. As usual, the down persists on the head and neck long after the remainder of the body is clothed in the contour feathers of the juvenile plumage. The ventral plumage of this very transient garb is quite downy and rather characterless, being of a pale buff with more or less indications of transverse darker markings, and the mantle and back, while of firmer vaned feathers, are greyish-buff mottled with dark rather than distinctly patterned. The scapulars and middle wing-coverts, however, show this mark at its fullest development, the feather being a rather even vermiculation of rufous and black up to the elongate, solid black ocelli, framed very effectively basally with a black-lined space of rufous, and distally by the solid, broad, golden-rufous terminal band. On the lesser and greater coverts there is less development of pattern, a narrow, black-lined terminal rufous bar taking the place of the ocelli. The wing and tail-feathers are quite dark chestnut, with considerable variation as to black mottling, some individuals showing a large amount, while in others the tail is very dark but wholly unmarked. The rectrices are short, narrow and quite curved, the outer ones being almost sickle-shaped, an interesting reversal of the conditions in the adult male, where the outer ones are straight and the central ones curved.

First Year Plumage.—The change from the juvenile to the plumage of the first year is marked chiefly by the complete loss of the ocellus pattern. The change in the dorsal plumage of the body is very slight. Instead of the black vermiculated pale buff feathers we find warm reddish-buff tones, the contrast showing the new feathers as generally darker and warmer, with a decided terminal fringe. This, however, has no tinge of the ultimate steel-blue, but is rather a purplish or wine colour, rather indefinite in tone, but clearly distinct from the remainder of the feather. This is especially marked on the lower mantle and back. The new secondaries are much darker, showing a reduction in the rufous vermiculation, this being confined to the outer two-thirds of the outer web. The tail-feathers are more variable, always predominately chestnut, but in some individuals with a great deal of black mottling. They are considerably larger and broader than the juvenile rectrices.

The change on the ventral surface is from pale buff to darker rufous feathers, with more distinct irregular, narrow cross-bars. Anteriorly, on the upper breast, the rufous darkens, and in certain lights a distinct crimson tinge may be observed on the fringe, prophetic of the strong crimson collar of the succeeding plumages. The dorsal head plumage comes in darker, but the chin and throat are still pale ashy brown. The facial area loses some of the tuftlets of tiny feathers, and the wattles become distinct fleshy lobes. In no newly-moulted bird in first-year plumage have I observed any trace of steel-blue margins, only the darkened or crimson-tinged fringe which I have mentioned. Weight, 1¾ lbs. Length, 488; bill from nostril, 17; wing, 215; tail, 145; tarsus, 85; middle toe and claw, 60 mm.

Young Male in Transition, Moulting into Second Year Plumage.—A bird shot in June is in full moult. The wattles are not much further developed than in the younger birds, but the face is somewhat more bare of feathers. At this moult the juvenile ninth and tenth primaries are renewed for the first time. In this individual the thirteenth secondary of the right wing and two back feathers have been lost by accident and renewed a month or more earlier, and the new feathers show narrow but clear-cut steel-blue margins, very conspicuous among the rufous and black vermiculated feathers, the blue colour evidently becoming strongly developed in any feather which grows in a few months after the moult from the juvenile.

Second Year Male.—The male White-tailed Pheasant after its second annual moult bears quite a close resemblance in body plumage to the adult, but still carries a chestnut tail. The principal difference in the contour plumage is the much less development of the convex, terminal band of shining blue. The crimson of the neck and anterior body consequently is less concealed, and stands out very conspicuously. In fact, the rich crimson or wine colour is at this stage very pronounced on all the dorsal plumage, the terminal blue bands being very narrow. The feathers of the crown are dark purplish-black, considerably mottled with rufous. The wing-feathers show no trace of white. As early as two months after this second annual moult is completed, if any of the chestnut rectrices or upper tail-coverts are lost, they will be replaced by pure white feathers, or with the white marred only by a terminal patch of dark brown. And if this be an outer tail-feather, the web will be very defective and much of the shaft bare, showing that the congenital degeneration is evident long before the time for the normal growth of this plumage. The size of this adventitious feather is not correlated with the adult colour, but is nicely adjusted to the length of the chestnut feathers growing on either side. Thus while the normal chestnut outer tail-feather of the second-year plumage is about 115 mm., and the corresponding white feather of a fully adult bird 220 mm. an adventitious outer rectrice appearing during the second year will be nearer the lesser than the greater length. Thus we see that the static pigmental and structural change in the blood long precedes that of size, and whether it is a direct adaptation or not, the danger to the bird at this age of undue conspicuousness together with a hindrance of the normal use of the tail in flight, is certainly avoided. The presence of a single long, projecting white feather would assuredly be a considerable handicap to the immature pheasant. It was from exactly such a case as this—the asymmetrical appearance of a second-year tail with an adventitious white feather or two, that confirmed Sharpe's suspicion that the chestnut-tailed bird was only the immature of the white-tailed adults.

Throughout this year's growth there is considerable increase in the size of the wattles, and after they have reached a very moderate length the occipital wattles show their characteristic, darkened, bifurcated tips. But it is not until several months after the next moult into fully adult plumage that they attain full size, at the period of the next breeding season.

Bill from nostril, 19; wing, 248; tail, 188; tarsus, 88; middle toe and claw, 63 mm.

Parasites.—White-tailed Pheasants appear to be particularly subject to the presence of Mallophaga, and seldom do we find a bird without numbers of the empty flattened egg-cases tightly attached to the barbs of the ventral plumage. I have seen some cases where there were so many hundred of these, and so evenly distributed, that they gave the appearance of some normal structure of the feathers themselves.

EARLY HISTORY

It is remarkable how long this splendid species of pheasant evaded discovery throughout the first fifty years when collectors were gathering specimens of vertebrates from various parts of Borneo. Wallace never apparently heard of it, and as late as 1874 Count Salvadori did not include it in his "Catalogo sistematico degli Uccelli di Borneo." In December of that same year, however, Sir Hugh Low obtained a specimen in the mountains bordering the upper Lawas River in the Sultanate of Brunei, and gave it to Sir Henry Bulwer, Governor of Labuan. The latter gentleman forwarded and presented it to the British Museum, and Sharpe at once described it, naming it after the donor. In 1875 Gould figured this specimen in his "Birds of Asia."

Two years later a pair of Wattled Pheasants was obtained alive, the male dying in Java, the female reaching Amsterdam, but surviving only a few weeks. Sclater figured the female in the "Proceedings of the Zoological Society" for 1876. In the following year a pheasant was obtained by a succeeding Governor of Labuan from the Lawas River with rich chestnut tail-feathers, and the concensus of opinion of Sharpe, Sclater and Gould was that it was undoubtedly a new species to which the former gave the name of *castaneicaudatus.* Sharpe's taxonomic intuition, however, led him to add, "I must confess that the smaller size of the wattles and the plumed head induced me to consider this new bird as being probably *L. bulweri* in an intermediate stage, perhaps in the second year."

Subsequent specimens proved the entire truth of this suspicion, and thus we account for the only synonym which has been applied to this species—a most welcome simplicity of nomenclature after such unfortunate taxonomic tangles as surround the specific identity of the species of *Lophura!*

SYNONYMY

Lobiophasis bulweri Sharpe, Ann. Mag. Nat. His., [4] XIV. 1874, p. 373 [Lawas Mts., Sarawak]; Gould, Birds of Asia, VII. 1875, pl. 13; Sclater, Proc. Zool. Soc. 1876, p. 465, pl. XLIV.; Sharpe, Ibis, 1879, p. 267; Burbridge, Gardens of the Sun, 1880, p. 61; Treacher, Ibis, 1888, p. 413 [Kinabatangan]; Everett, List Birds Borneo, 1889, p. 198; Sharpe, Ibis, 1892, p. 422 [Mount Dulit]; Grant, Cat. Game-birds Brit. Mus. 1893, p. 292; Hose, Geogr. Jour. 1893, I., p. 201; Hose, Ibis, 1893, p. 442; Sharpe, Ibis, 1893, p. 548 [Mount Kalulong]; Sharpe, Ibis, 1894, p. 544 [Mount Mulu, 1000–2000 ft.]; Grant, Hand-book Game-birds, I. 1895, p. 249; Sharpe, Hand-list Birds, I. 1899, p. 35; Büttikofer, Notes Leyden Museum, XXI. 1900, p. 271 [Mount Liang Koeboeng]; Oates, Cat. Eggs Brit. Mus., I. 1901, p. 53, pl. V., fig. 2; Finsch, Notes Leyden Museum, XXVI. 1905, p. 142 [Upper Mahakam, Dutch Borneo]; Beebe, Zoologica, I., No. 15, 1914, p. 273 [sequence of plumages].

Lobiophasis castaneicaudatus Sharpe, Proc. Zool. Soc. 1877, p. 94 [Lawas River]; Gould, Birds of Asia, VII. 1877, pl. 12; Sharpe, Ibis, 1879, p. 267.

GALLUS
THE JUNGLEFOWL

GALLUS

THE JUNGLEFOWL

Family PHASIANIDAE

Subfamily PHASIANINAE

Genus *GALLUS*

THROUGH the form of the domestic fowl, this group of birds is familiar to more people than any other which comes within the scope of this monograph. The breed known as the black and red game is very close to the wild Red Junglefowl, which may stand as the type of the genus.

Admitting four species as comprising the genus, we find that they are birds of medium size, characterized in the cocks by the following features. The bill is stout, fairly short and curved, and the feet are strong and pre-eminently fitted for scratching. There is a large, erect, fleshy comb on the top of the head, extending from the base of the bill to behind the eyes, with the margin serrated or entire. The sides of the face, chin and throat are bare, either with two pairs of wattles situated below the ears and on each side of the throat, or a single median wattle down the middle of the throat.

The tail is composed of seven or eight pairs of feathers. This organ is strongly laterally compressed, and slightly graduated except for the central pair of rectrices, which are much longer than the others, soft in texture and curved, resembling the upper tail-coverts. These are about twice as long as the second pair, and four times the length of the outer rectrices. The first primary is considerably shorter than the tenth, the fifth being the longest. The tarsi are longer than the middle toe and armed with well-developed spurs.

The feathers of the rump are long and lanceolate, and the hackles of the neck are of the same character, or if truncate have a specialized curve in the vane near the tip, and show iridescent colouring.

All four species will cross with one another, and the hybrids are more or less fertile among themselves. The moult is typically Phasianine, that of the tail being from the outer rectrices inward. In the females the comb is rudimentary, while the wattles, specialized hackles and central rectrices and spurs are lacking. Thus we see that the secondary sexual characters are the comb, wattles, hackles, central tail-feathers and spurs.

The only one of these characters which may be taken to distinguish the genus is the comb. The compressed tail is found in *Lophura*, *Acomus*, *Lobiophasis* and others; the lateral wattles and the hackles in *Chrysolophus*, and the median wattle in *Tragopan*.

The four species fall into two quite distinct but unequal divisions, good subgenera they might be called; first, *gallus*, *lafayetti* and *sonnerati*, and second, *varius*. These have been considered as two genera (*Gallus* and *Creagrius*) by a few writers, *e.g.* Ghigi, 1903. *Varius* possesses the peculiarities of a smooth-edged comb, a median throat wattle, truncated neck hackles and an extra pair of rectrices. Taking the group as a whole, however, the hiatus between the four species and the nearest related genera seems much greater than between the two groups themselves. So I choose to keep them together. And here comes in the question of logicality; whether by doing this I have not been somewhat illogical in comparison with other generic divisions. This is of not the slightest moment to me. No two genera of the Phasianidae or any other group of organisms, as now isolated by time and space on the earth, are separated from each other by exactly the same intervals of character distinction. Classification, we all admit, is merely the make-shift, incident upon, and made necessary or indeed possible by, our ignorance of intervening forms. Hence relative clarity of interrelations is its sole aim. In this instance the genus *Gallus*, considered as embracing all four forms, expresses much more exactly the homogeneity of the quartet as a whole than would the isolation of *varius*, such segregation setting it as far apart from *Gallus* as is the genus *Chrysolophus*.

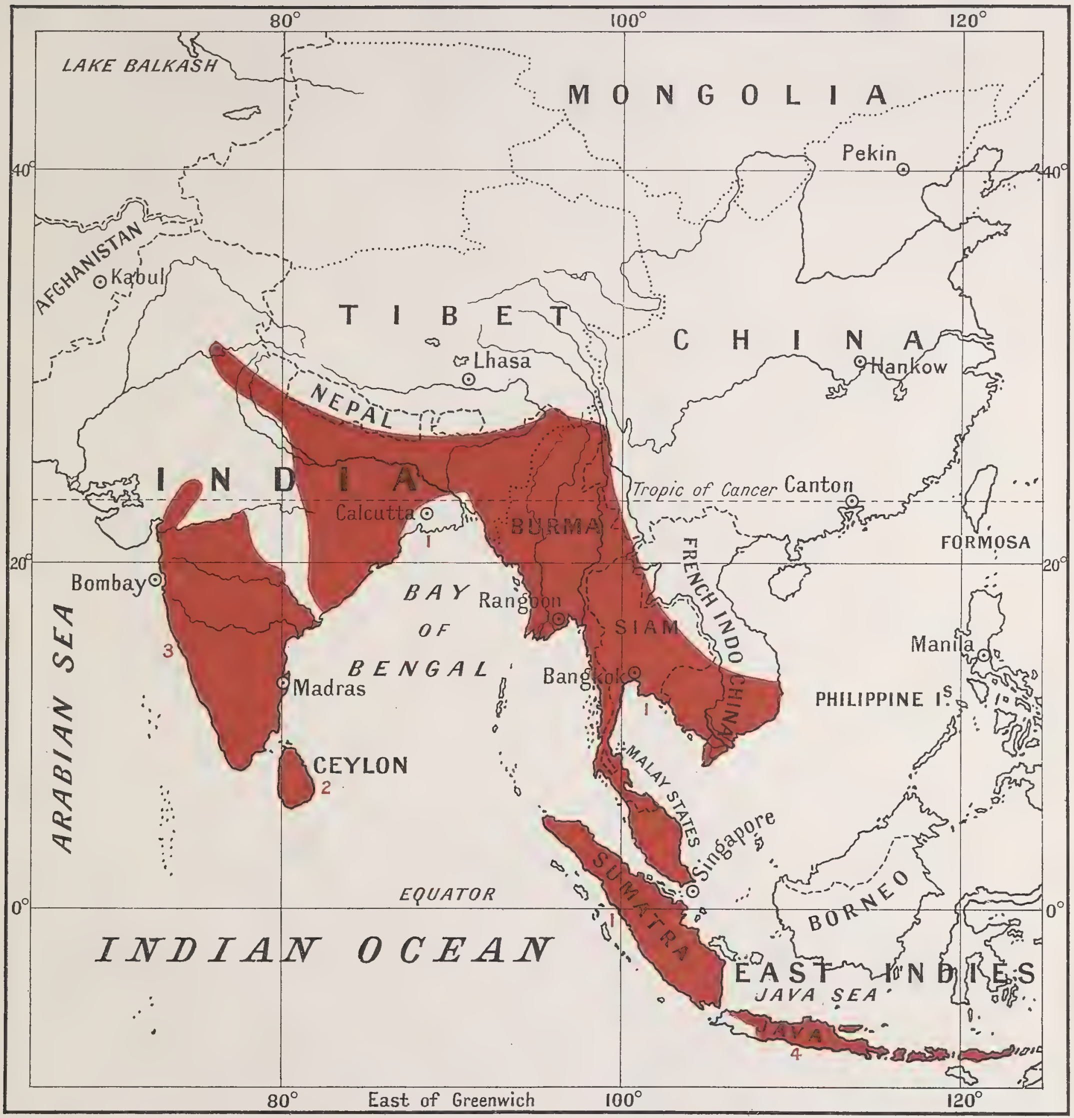
There is no doubt that the Red Junglefowl alone is the direct ancestor of all of our domestic poultry, so this question is removed from the discussion. Study of the plumage of the four species shows a tangle of characters, which can be logically oriented only when we think of all four birds having descended from some form quite different and much more generalized than any of them are to-day. For example, taking the cocks first, the ventral plumage brings *gallus* and *varius* close together; the dorsal surface shows a close similarity between *gallus* and *lafayetti*. *Sonnerati*, while it has a general body plumage of a much more generalized pattern and coloration than any of the others, has hackles and wing-coverts more specialized than in the other three, the peculiar sealing-wax-like spots deserving of as great distinction as some would give to *varius* for its peculiar characters.

The hens, on the contrary, show propinquities entirely unlike those of the respective cocks. The ventral plumage associates closely *lafayetti* and *sonnerati*, while the dorsal patterns and colours indicate an affinity between *gallus* and *sonnerati*, and the generalized black and white wing-bars link *lafayetti* and *varius*.

GALLUS

	Type.
Gallus Linnaeus, Faun. Suecica, 1746, p. 61	*G. gallus.*
Alector Klein, Hist. Av. Prodr. 1750, p. 111	*G. gallus.*
Creagrius Gloger, Hand- u. Hilfeb. 1842, p. 387	*G. varius.*

This well-marked group of four species is widely distributed throughout India, Burma and the Malay Peninsula, Ceylon and Java. Where it occurs outside of these regions it has probably been introduced by man. The four species are as follows—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AFGHANISTAN
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TIBET
Lhasa
CHINA
Hankow
NEPAL
INDIA
Calcutta
Tropic of Cancer
Canton
BURMA
FRENCH INDO CHINA
FORMOSA
Bombay
BAY OF BENGAL
Rangoon
SIAM
Manila
ARABIAN SEA
Madras
Bangkok
PHILIPPINE Is.
CEYLON
MALAY STATES
Singapore
SUMATRA
BORNEO
EQUATOR
INDIAN OCEAN
EAST INDIES
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JAVA
1
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East of Greenwich

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MAP SHOWING THE DISTRIBUTION OF THE JUNGLEFOWL.

Region	1.	Gallus	gallus.
,,	2.	,,	lafayetti.
,,	3.	,,	sonnerati.
,,	4.	,,	varius.

Red Junglefowl	*Gallus gallus* (Linnaeus).
Ceylon Junglefowl	*Gallus lafayetti* Lesson.
Gray Junglefowl	*Gallus sonnerati* Temminck.
Javan Junglefowl	*Gallus varius* Griffith.

KEY TO *GALLUS*

I. Comb and spurs largely developed; middle pair of tail-feathers elongated (males).
  a A wattle on each side of the throat; tail of fourteen feathers.
    a' Lower plumage black . . . . *gallus.*
    b' Lower plumage orange-red . . . . *lafayetti.*
    c' Lower plumage black, edged with grey and with a white shaft-stripe . . . *sonnerati.*
  b A median throat wattle; tail of sixteen feathers . . . . *varius.*
I. Comb rudimentary; spurs absent; middle tail-feathers of normal shape (females).
  a Lower back reddish-brown, finely mottled with black.
    a' Breast pale reddish-brown . . . . *gallus.*
    b' Breast white, fringed and marked with black.
      a'' Outer web of secondaries widely barred with buff and black . . . . *lafayetti.*
      b'' Outer web of secondaries brown, finely mottled with black . . . . *sonnerati.*
  b Lower back black, fringed and centred with buff . . . . *varius.*

RED JUNGLEFOWL

Gallus gallus (Linnaeus)

Names.—Generic and specific: Gallus, Latin *gallus*, a cock. English: Red or Wild Junglefowl. German: Kaminhuhn; Bankivahuhn; Wildhuhn. French: Coq bankiva. Native: Jungli murgh ♂, Jungli moorghi ♀, Bun moorghi (Upper India); Kukar, Kukra, Bun-kookkoor, Bunkokra (Bengali, Lower India and Assam); Nagtse-ja, Natsu-pia (Bhutan); Tang-kling, Pazok-tchi (Lepcha, Sikhim); Beer-seem (Koles); Gera-gogor ♂, Kuru ♀ (Gonds); Lall (Chanda); Tanghet or Tanquet (Burma); Ajam-utan (Celebes). In the Malay States the following names are current: Manuk (Negritos); Nanâk (Northern Sakai tribes of Upper Perak); Dĕnâk, Puk Dĕnâk (Central Sakai of Batang Padong); Ayam Dĕnâk, Ayam Mĕrih (Forest fowl, Besisi of Selangor and Negri Sembilan); Pok Brugâk (Jakun of Pahang); Ayam Utan, Ayam Dĕnâk, Ayam Borga (Junglefowl, Decoy fowl and Wildfowl respectively; Malay).

Brief Description.—Male: Crown, neck and hackles golden brown to orange-red, passing into straw yellow on the longer hackles. Mantle, smaller and greater coverts metallic green or purple. Scapulars, back and median wing-coverts dark maroon, shading into orange-red on rump. Exposed parts of secondaries cinnamon. Tertiaries and tail metallic green. Lower parts black. Face and throat thinly feathered; a serrated comb and two gular wattles. Female: Rusty red on head, shading into orange on neck and pale yellow on mantle with median black stripe. Upper parts reddish-brown, finely mottled with black. Secondaries mottled with pale brown on outer webs. Fore-neck chestnut. Rest of under-parts pale light red. Face thinly feathered, comb very small.

Range.—North-eastern and Central India, south through Siam, Cochin-China and the Malay Peninsula to Sumatra. Introduced in many other islands of the East Indies.

THE BIRD IN ITS WILD HOME

Far up in the wilderness of Northern Burma, close to the Chinese border, I left camp one morning before dawn, shivering in the cold December dusk. As I brushed against the wet undergrowth, some bird now and then uttered a startled chirp, or, not yet fully awakened, began a sleepy refrain. No other sign of life came from the jungle. The air was heavy with the overpowering sweetness of a multitude of white blossoms draped on vines from tree to tree. Within the next two hours I sought and found the place where a flock of kaleege pheasants passed over the ridge every morning from roost to water.

On my return the sun was already well up and the early morning chorus in full swing. At this season the jungle trails are alive with butterflies. As one walks along they rise in myriads, alighting on one's clothes and hat, brushing one's face like a flurry of leaves in autumn. Scores of species of all the spectrum's hues are seen within the space of a few yards.

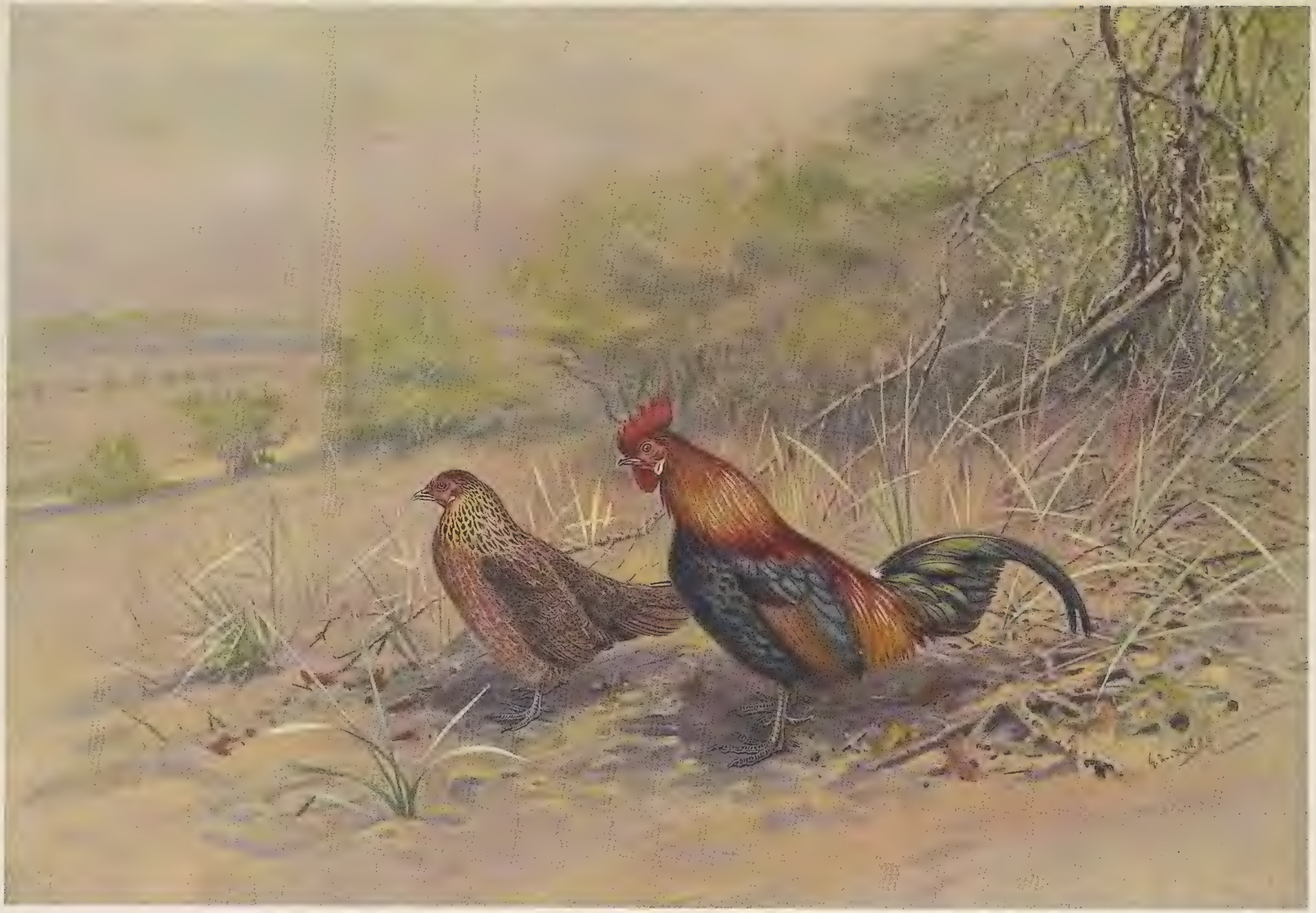
Birds are eagerly hunting their breakfast, but snatching every spare moment for song or cry. Rollers fly past, flashing their brilliant heliographs of blue from beneath the dull brown wing-coverts. As we approach a straggling Shan village, the undergrowth thickens and small birds increase. A flock of at least fifty silver-eared mesias drifts past, then a gorgeous yellow and black Indian oriole, and a jewelled sunbird shoots up like a meteor.

RED JUNGLEFOWL

Gallus gallus (Linnaeus)

To the human race this is the most important wild bird living on the earth, for it represents the ancestor of all varieties of domestic fowl. It ranges from the border of Kashmir to Singapore, and is found in the wildest regions, as well as close to native villages, with the fowls of which the wild birds frequently cross. Its crow is bantam-like, and sounds strangely out of place when heard in deep jungle. These Junglefowl are usually monogamous, the hens lay from five to eight eggs.

PLATE XL.



RED JUNGLEFOWL.

From the distant village comes the long-drawn, wavering crow of chanticleer, and then pandemonium in the shape of two hundred mules loaded with rice and ammunition, and guided by an escort of swarthy Punjabis. The jingling of bells, screaming of coolies, and undisguised complaints of the mules themselves fill the air with a continuous din, as I crouch unseen in a clump of bushes near the trail which leads to China. Finally, the last falsetto shriek dies out in the distance, and a dyal-bird sends up his clear, sweet phrase, clearing the jungle air and giving it over again to the sounds of the wilderness.

Two hundred yards farther on, the edge of the jungle opens upon the encampment of the preceding night, a disordered litter such as only ten score of army mules can leave. The scavengers are already at work, doing their part to re-sweeten the field again. Forty great black pigs, several vultures with others circling downward each minute, a score of many-hued doves and dyal-birds, all at work, the first snuffling among the remains of the forage bags, the latter daintily catching flies—those scavengers of a still lesser world of life.

Suddenly in the very midst of it all my eye caught a bit of incongruity. Walking with quick, nervous steps among the lethargic pigs and the crowding, scratching hens was a wild Red Jungle cock. Every poise of body, every turn of the head spelled caste. Never for an instant was he off his guard. Only at the rarest intervals did he snatch some morsel of food.

Once a native cock approached with ruffled hackles; the wild cock gave a sudden turn in the direction of the threat and the coward took to instant flight. My glasses showed the sleek, slender body, the dark, trim legs and the sinister black curving spurs capable of dealing death with a single thrust. Once, and once only, did the jungle bird forget himself for a moment. He crossed the path of a brown hen, much too big for any strain but that of the farmyard, yet without the white and blacks which marked the other hens. She had retained the jungle tints, and as if he recognized it, the wild cock turned aside and made one quick, brilliant obeisance. A narrow circling-turn sideways to the hen, inner wing dropped, back flattened, hackles and tail spread. Just for a moment he was agleam, the sun reflecting metallic red, green and purple from his plumage. Then a great lumbering pig interrupted my view, and when seen again the bird was quietly making his way through the throng, unnoticing, but not unnoticed. Not a cock or a hen but ceased feeding or scratching when he passed near. They recognized him as something alien, perhaps as superior, certainly to be respected, for they took no liberties with him.

All this came clearly through my glasses, and then, when about to walk on, I saw the jungle cock give one leap and vanish behind a low bush. The other creatures paid no attention to the cause of the alarm, and only when I stealthily stood upright did I perceive the native chowkidar, who had left the dâk bungalow and was making his way down to the river.

The cock crept carefully off toward the jungle, with never a stop for even a snatch at a morsel of food. Ten minutes later, some distance to my left, I heard his sharp, decisive double crow, so free of quaver or drawl, so like to the wild call of his pheasant kindred: *cock-ka-chârr!*

After a hasty cup of cocoa and a cracker I started on a stalk, and creeping up to the top of the ridge in the still early morning sunlight, I found me a lowly place beside a small fallen log. The wood upon which I rested was torn with the shot which had laid low a Horsfield's kaleege two days before, when we needed fresh meat for the pot, but no pheasants were hereabouts this day. I idly watched a huge grasshopper creeping slowly up a dead sapling, and unconsciously made a sudden motion to brush away a cloud of mosquitoes which had found me out. At once a great outcry arose only a few yards away down the slope—a jungle hen had perceived that something was wrong on my side of the thicket, but whether a—to her—harmless water-buffalo or a real danger she evidently could not make up her mind.

By hitching along and wriggling worm-like over a few feet of wet ground I came within sight of the bottom of the gully. Several large clumps of bamboo were browsed to hour-glass shape by the—to me—fearfully dreaded self-same buffalo. Just below the yellow-green foliage was a wallow, partly filled with water, and at the edge of this, scratching daintily in the damp soil, was my jungle cock of the mule-field and his mate.

The cock allowed no fall of leaf or twig to escape him, and it was interesting to watch how, every second or two, he systematically swept the sky and the woods all about. The hen, evidently relying on his alertness, devoted all her attention to feeding, and her chuckle of content as she drew forth a large, protesting worm was delightful to hear.

When a squirrel rushed through the bamboos and loosened a bunch of large leaves which eddied downward, the jungle hen gave her loud, strident cackle, *cut! cut! cut! cut! cut-dá-cut!* exactly as a domestic hen announces an egg. In this case it was a startled exclamation of suspicion, given rapidly and sharply.

From some distance within the bog a forest cat was yowling querulously, but the junglefowl paid no heed until the sound ceased. Then, although they fed for a few minutes longer, much of their attention was concentrated in the direction from which the sounds had come. At last both listened intently, their heads drawn up to full height, and both started up the bank toward me.

But, as so often before in my experience, the clan of wood creatures came to one another's aid in an eminently effective manner, although so wholly unconscious of any altruism. A wretched chocolate squirrel and a quartet of laughing thrushes made my ears tingle with their expletives. Scarcely had they begun their tirade at me when the junglefowl made a quick dash down one side of the gully and passed out of sight for ever.

GENERAL DISTRIBUTION

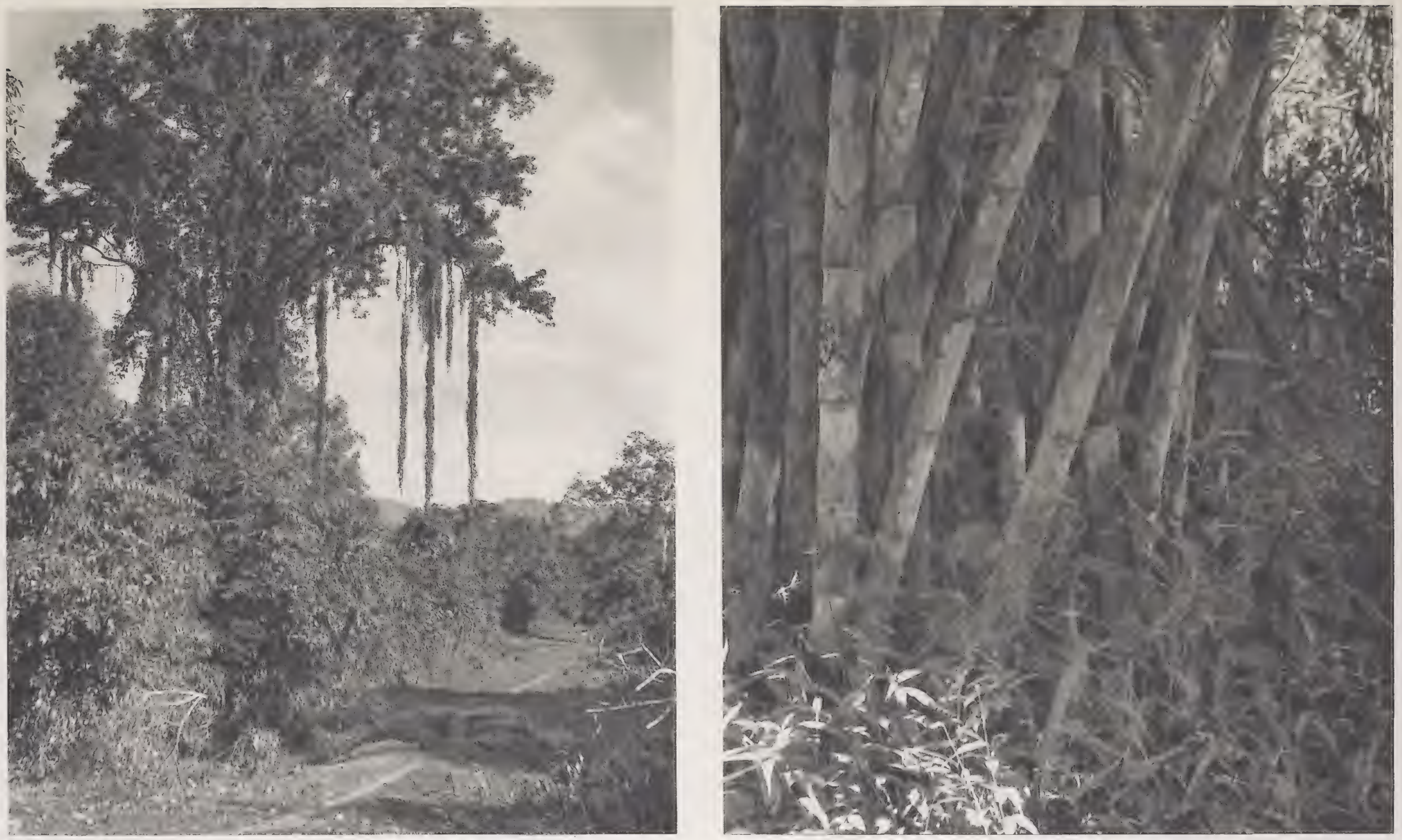
The present range of the Red Junglefowl is very extensive, but we must draw a sharp line between what appears to be the original area of distribution, and the recent extensions brought about by man. In northern India the bird extends along the terai and the southern outer ranges of the Himalayas, from the head of the Assam Valley beyond Sadiya, westward through southern Sikhim, Nepal and the Siwaliks of Garhwal to Kashmir. In the Punjab it occurs only in isolated, especially suitable districts, so sporadically, in fact, that the western extension from its more

HOME OF THE RED JUNGLEFOWL

In northern Burma I found the wild Junglefowl coming out to feed along the trails which lead from village to village. They cluck and scratch among the turf, and take dust baths exactly like our domestic fowl, and I have often found it difficult to shoot them, as the action seemed like unsportsmanlike slaughter in a barn-yard. At the first hint of danger, however, they lower their tails and run headlong, like pheasants, into the nearest underbrush.

The nests are hidden away in the clumps of bamboo, a mere hollow being scratched out, or the eggs deposited on the dry leaves.

PHOTOGRAVURE PLATE 30.



HOME OF THE RED JUNGLEFOWL.

extensive eastern distribution takes the form of a long, narrow finger laid along the southern Himalayan slopes. It thus rather closely parallels the range of the four Himalayan species of kaleege pheasants.

Although absent from the level, alluvial, semi-arid plains of Upper India drained by the Ganges, it reappears to the south in the northern and eastern portions of the Central Provinces and on southward as far as the Godavari River, especially toward the east coast, thinning out toward the west, and finally disappearing as we approach the line of central India.

Eastward we find it common, throughout the hilly portions of Bengal, the Sunderbans and the whole of Assam, including the Khasi, Gáro and Naga Hills, Cachar and Sylhet. The connection across the Ganges River is a rather narrow one, as the bird is not found in the semi-arid parts of Behar to the north, nor in the southern delta district. Still farther east we find its centre of distribution throughout Burma, including Pegu and Tenasserim, western Yunnan, Siam, Cochin China, and southward in the Malay Peninsula more particularly in the western half, and generally distributed in the island of Sumatra. It is absent from the island of Singapore.

In all this area I believe the Red Junglefowl to be more or less indigenous with slight changes in the general contour of the range, but showing no radical or important increases since mankind began exerting a direct effect on the environment and range of the species.

Severtsov and David state that the bird occurs in Western Turkestan. This is an error, except as domestic fowls are found associated with the natives. As the result of careful inquiry, I am very certain that the Red Junglefowl does not cross the Himalayas at any point, neither into Persia, Yarkand, Afghanistan or Tibet.

It is entirely absent from Borneo, but has been recorded as a more or less feral inhabitant of Java, Timor, Lombok, Celebes, the Philippines, Balâbac, Palawan and Hainan. Also in many of the isolated archipelagos and islands of the South Seas, such as Tahiti, Tonga, Viti, New Caledonia, the Great and Little Cocos, Ponapé, etc.

A few quotations giving the condition of the Junglefowl in some of these outlying islands, will be of value in supporting the supposition that they are all domestic birds run wild. There is no question about this fact in such isolated islands as Tahiti, but the fact of interest here is the apparent beginning of reversion to the wild colour type.

TAHITI

"The common dunghill fowl is found wild in the forests here. Some of the residents think it is a Junglefowl, peculiar to the country, but, upon examination, I have not been able to perceive any material difference between it and the domesticated bird, and therefore incline to the belief that it is the common species returned to its original habits. In my excursions, I have killed about a dozen of them. Their plumage is generally more rich and brilliant than that of the domesticated bird, and there is not so much variety in the colour of different individuals. Their flesh is exquisite. They are very shy, running away with singular rapidity, and concealing themselves on the approach of the sportsman. When flushed, they fly with great vigour and swiftness, and where the trees and bushes are not too dense, afford a very good mark" (Townsend, "Journey . . . to the Sandwich Islands," etc. 1839, p. 289).

Ponapé

"Of the specimens from this locality, the male shows no difference from specimens from Sumatra, except that the primaries are not cinnamon, but dull rusty brown, and the wings are a trifle longer. The female differs a good deal . . . I am inclined to believe that the differences which this bird shows are due to a domestic state" (Finsch, "Proc. Zool. Soc.," 1877, p. 780).

Sulu Island

"This jungle-cock, although very numerous on Sulu Island, is but rarely seen, owing to its haunting the thicker jungle and being very shy. . . . After a few days' captivity they become even tamer than domestic fowls, and are freely crossed with the latter by the natives" (Guillemard, "Proc. Zool. Soc.," 1885, p. 272).

And again, "Junglefowl are plentiful on Kushai and Ponapé, but on both islands they are not native species, but the offspring of imported tame birds, which have run wild and have returned to the original plumage of *Gallus ferrugineus*."

Pelew and Uap Islands

"Captain Peters sends a single female (from Pelew), but unfortunately he does not state whether the Junglefowl lives in a wild state in the islands, or as in Uap, as Mr. Kubary remarks, only in a half-wild state."

Wetter, North of Timor

"Wild fowls were met with in great numbers on Wetter, but the great variation in the males and the geographical distribution at once suggest that they are feral. Some of these birds, in fact the majority, are indistinguishable from *Gallus ferrugineus* from India and China, though some have very short tarsi. Probably either wild-caught *G. ferrugineus* have been introduced, or more likely a race of domestic fowl descendant from *Gallus ferrugineus* has run wild and thus the jungles are inhabited by an apparently quite wild fowl" (Hartert, "Novitates Zoologicae," XI. p. 176).

Negros

"The collection contains a female Junglefowl which is entirely black, with greenish-metallic reflection.

"At first I much doubted if such a melanic specimen was likely to be of wild origin. Mr. Keay, however, assures me that the bird was not a roving specimen. It was seen for several days on the margin of the forest, in company with a normally-plumaged cock, and was finally secured by Mr. Keay with some difficulty, as it was very wary and smart on the wing. When shot it towered to a height of over 150 feet, and then fell dead.

"Mr. Keay is convinced that it is a genuinely wild Junglefowl; and, if measurements are any guide in the case, the specimen is certainly only of normal dimensions, the wing being 7·5 inches. On the other hand, I am unaware that this species is variable in plumage, and can find no mention of its being liable to melanism" (Clarke, "Ibis," 1900, p. 360).

JAVA

My own researches in this island have led me to the certain belief that the Red Junglefowl is a recent introduction, an intruder into the territory of the true Javan bird (*Gallus varius*).

Many more instances might be adduced of quite clear proof of the running wild of domestic fowls, and while I shall allude to this in another connection, I mention it here only to emphasize the importance of trying to limit the range of this bird to the natural, normal boundaries. I admit Sumatra as a valid locality, because of the corresponding distribution of several species of pheasants, such as the Malayan crestless fireback (*Acomus erythrophthalmus*) and the Malayan argus pheasant (*Argusianus argus*).

I have mentioned the fact that the Junglefowl occurs in the Sundarbans, which is the name in use for the extreme delta region of the Hoogly and other rivers which are derived from the Ganges. Concerning these birds Mr. Rainey writes: "I may add that the Junglefowls in the Sundarbans appear to be descended immediately from domestic fowls, which used to be let out there in considerable numbers by superstitious wood-cutters to propitiate the sylvan deities—a practice still prevailing to some extent—and I have shot these birds there in different stages of transition. This is interesting, as we evidently thus find the domestic fowl reverting to its pristine condition, for the Red Junglefowl is undoubtedly the origin of our tame varieties of fowl. I had a couple of chicks produced from eggs of wild birds set under the domestic fowl, and they remained contentedly in the poultry-yard, and freely bred—they were both hens—with the tame fowl. The progeny were in appearance midway between their parents, and exactly similar to some I had shot in the Sundarbans. About that time the cyclone of 1867 swept over the place I was residing at, and of course put a premature end to the varied denizens of the poultry-yard, hybrids included. I soon afterwards left my abode in the wilds of the Sundarbans, and have had no opportunity since of continuing the experiment." There seems little doubt that all the birds of this isolated, unique region are actually domestic birds run wild, so that even on the mainland, adjoining the natural haunts of the birds, we may have, as in this case, a zone stocked by man, where the birds have become almost indistinguishable from the feral individuals elsewhere.

GENERAL ACCOUNT

Of all the pheasants, indeed of all the birds in the world, the Red Junglefowl stands first in importance to mankind on the earth. From this species, and this alone, all the forms of domestic fowls have taken their origin, and hence from the point of view of economic utility this bird assumes a position of great interest. With this point of view in our general account of the species we are not directly concerned, but it is well to state the fact at once, so that the details of its life history may not be forgotten when we come to compare the feral and the domestic birds, and to attempt to trace the part which the cock and the hen have played in the history of mankind.

It is difficult to correlate the habits or to present them in a uniform, inclusive summary in the case of a bird such as this, which ranges from the borders of Kashmir to the southern limits of Johore. I met with the Red Junglefowl in many countries and watched it under many varying conditions, and in most cases I have found it necessary to do away with the convenient generalizations which are so easy to make in the case of pheasants of more restricted range, living under more homogeneous ecological conditions.

I believe the home range of the Junglefowl is of quite limited extent. I have been told by tea-planters of a family of these birds which inhabited a certain bit of bamboo jungle month after month, apparently never leaving it except to make short excursions for water and food. And these sedentary habits are, I believe, more pronounced in this group of birds than in most of the more typical pheasants. During the breeding season the birds which frequent some given area are seldom seen, retiring into the deeper, denser parts of the jungle. But there is no extensive wandering. Where wild birds get into the habit of feeding upon crops, or associating with domestic fowls, they correspondingly limit their home range even more, and when not molested, their comings and goings can be timed as accurately as in the case of the barnyard fowls themselves.

Taking three thousand feet as an average maximum height, we find the Junglefowl living at a comparatively low elevation. The great proportion are not exposed to any but slight changes in annual temperature, and hence have no cause to make even limited seasonal migrations. The birds which range up the valleys and southern slopes of the Himalayas, are found breeding at a maximum height of about five thousand feet, while occasional records show that exceptional individuals may wander upward two thousand feet higher. These, of course, are affected by the approach of cold weather, and as I observed in Garhwal, descend several thousand feet to warmer altitudes, reascending when the warm weather again returns. So we see that with these local exceptions, no regular seasonal migration is to be found among Red Junglefowl.

While the name Junglefowl is quite correct, bamboo-fowl would be even more appropriate, as they are especially fond of this type of vegetation, and as I look back over my memories of these birds, any visualizing of them is invariably accompanied by a background of the tall, curving stems and the soft foliage of bamboo.

Rarely I have found them in heavy tropical forest devoid of bamboo, and in the vicinity of the semi-arid plains they must needs be content with the shelter afforded by clumps of acacias and other similar plants.

Throughout India the Junglefowls live of necessity more or less close to cultivated districts, and indeed, even in the less settled parts of Burma and the Malay States, I found them far more often in the vicinity of native villages than in the trackless depths of the jungle. This fact must be taken into consideration in speaking of their comparative abundance. On the whole Red Junglefowl show a remarkably even distribution. In a country suited to them and within their general range they are almost certain to be found. That is to say, there is not the inexplicable *inter habitat* hiatuses which characterize some of the true pheasants. Exceptions, of course, are to be found where they have been exterminated by human agency from some intermediate tract of country. Considered in general they may certainly be said to be abundant, probably the most abundant of the so-called game-birds in the East, although it is hardly fair to make this comparison, owing to the constant recruits to their ranks from half-wild native fowls.

Red Junglefowl are sociable birds, and, except during the breeding season, when association is either for fighting or for pairing, they are often found in good-sized flocks. They are found very frequently in pairs, and it is seldom that I have seen or have heard of a solitary cock or hen.

As often as I heard the Red Junglefowl in various Eastern countries it was always with a start at such familiar, barnyard sounds coming from the jungle, where sometimes I knew there were no human dwellings within a distance of many leagues. When in search of a specimen or a bird for the mess, more than one has escaped with its life by giving utterance to such domestic sounds that I unconsciously withheld my fire.

The crow of the Red Junglefowl, like the details of plumage and colour of wattles, shows quite marked variation, which is rather individual than characteristic of the birds of any one district. This is undoubtedly due to the infusion of a domestic strain in many apparently purely feral birds. I have several times had the opportunity of watching and hearing Junglefowl crow, in districts far from cultivated areas, the birds showing by their low-hung tails and lank, rakish carriage that they were in appearance at least truly wild.

On one such occasion I had concealed myself at earliest dawn in a thicket, on either side of which ran a trickle of water. This was in the heart of the Pahang jungle, and my choice of this particular place was influenced not only by the fact that for several days I had heard a Junglefowl calling near by, but also that it was free from the hordes of leeches which infested the surrounding foliage, and which made stationary observation elsewhere an impossibility.

I became aware of the bird first by an excited cackle, which I feared was caused by the discovery of my presence. But through the leaves I saw that its attention was directed elsewhere. Its suspicion was soon allayed, and it came quietly on to the edge of the dark jungle rivulet, where, after a momentary delay, it leaned down, swiftly scooped up a beakful and again froze into a statuesque attitude of keen scrutiny. Seven times the bird drank, then turned aside, wiped its beak upon a pebble and instantly flew up to a bare branch about twelve feet from the ground, its wings beating rather noisily.

Three or four minutes passed. Then the bird flapped its wings three or four times, giving forth resounding smacks, and at once crowed, then listened intently. Again and again the challenge rang through the jungle, without, however, any further beating of wings. Once a distant crow was heard in answer, and this caused an excited reply of several utterances in quick succession, followed by an equally long period of waiting. After a half-hour the bird descended and vanished into the forest. Its cry as I wrote it down on the spot was *Err-er-érk—er! Err-er-érk—er!* The accent was all on the third note, while the fourth was sometimes very weak, and at a distance would have been inaudible. It seemed more like an involuntary intake, or recovery of breath, than an actual integral part of the call.

This bird was unquestionably challenging. Every motion, every attitude attested this, and on another occasion I observed the same thing.

But at another time in the terai I had the good fortune to watch and listen to a bird which was crowing and yet not challenging. I knew he had a mate near by with a nest, although I did not actually locate it until a day or two later. The Jungle cock was on a fallen log, and his whole demeanour was of assured peace. He was alert, but only as any wild bird is whose life is one long fight against danger. His crowing was intermittent, uttered at a lower pitch, and did not have the tang and abruptness of the challenge. It had a hint of the domestic drawl, and between each effort he sang to himself the low, content song with which we are so familiar in the barnyard hen—*Wăăăăăăăăk—wăăk—wăăăăăăăk!* The whole seemed to me a real song, to be compared with the tempered notes of a thrush who perches near his mate on her nest and gives this vent to joy in the success of his life.

The difference in the apparent human phrasing of birds' songs when heard near by and at a distance is very apparent in the case of the Junglefowl. In Garhwal I have more than once mistaken the *Kok! kok! koklass!* of the koklass pheasant for the Junglefowl and *vice versa*, when the notes were softened and mellowed by filtering through the mist of a long length of valley. Others also have noticed this resemblance.

More commonly heard than the *Err-er-érk!* is a less wild, less distinctive call, that which I take to be influenced by some domestic strain, although uttered by birds which, in habits, are as truly feral as any bird of the jungle. When heard near at hand, this sounds to our ear like *Cak-ka-chárr!* or *Cock-ka-charr—ca!* This bears a fair comparison to the crow of some breeds of bantams, and an additional interesting fact is that the domestic birds whose crow most closely resembles that of the wild Junglefowl are those whose plumage is nearest the red and black of their feral ancestors. Even the crow of the wild birds quoted above is always, however, distinct, being shorter, more viril and wholly lacking the final drawl which seems to hint of the degeneration of the domestic cock.

The cackling of the wild hen, as I have already said, is given in moments of excited suspicion. I do not know whether the direct stimulation of having deposited an egg also inspires this note or not. I have never heard it in a captive wild-caught bird, but several times I have known the first generation of captive-bred birds to give voice to it. I am inclined to believe that it is a call to the cock, giving notice that the nest duties of his mate are for the moment over. I have known a peahen to leave her nest with a half-running, half-flying rush, and to call loudly until her mate came, when they went off quietly feeding together.

The squawk of a wild bird when picked from a trap or a wounded one when caught in the hand is indistinguishable from the note of terror of the domestic fowl, but it is never continued for minute after minute as in the latter, but uttered once or twice, and then the bird awaits its fate in silence. The cackle of the wild hen is sharp and shrill, and the cackle of fear uttered as birds are suddenly flushed is as much pheasant-like as it resembles the corresponding utterance of a barnyard hen fluttering over a fence from a pursuing dog. The peeps of wild chicks differ in no way from those of the fluffy yellow offspring of our domestic hen.

In gait and carriage there is much difference between individual Junglefowl, the same influence being at work here as in the case of the voice. The birds which haunt the vicinity of villages have usually much more of what we are pleased to call a proud carriage than the real jungle individuals. The tail is held higher and the movements are slower and more dignified, as we interpret them. But once the real fowl of the deep jungle is seen it will not be forgotten.

I have seen many so-called Junglefowl in captivity and they satisfied all the requirements of the casual observer, who would remark that such splendid carriage was well worthy of the ancestor of our common fowls, and similar sentiments. But the pair of birds which arrived at the London Zoo in 1912 were almost the first real feral Junglefowl I have ever seen in captivity. Dignity was absent; the carriage was that of an untamable leopard; low-hung tail, slightly bent legs; heads low, always intent, listening, watching; almost never motionless, but winding in and out of the shrubbery, striving to put every leaf possible between themselves and the observer! To my mind, they fulfilled every ancestral requirement much more satisfactorily than the usual Junglefowl type. It would take more than one generation to tame them. They were wild as the pheasants of the Himalayas. Dignity and high-bred carriage they doubtless had, but it was reserved for their kind; for the combats and the courtships of their own haunts, not struttings and steppings while mankind looked on. All this is not a sentimental point of view, but a very real distinction.

I have walked along a trail and suddenly come in sight of several Junglefowl, who looked at me, drew up to their full height and hurriedly enough, but with raised tails, took to the jungle. And again I have walked behind a soft-padding army elephant in Northern Burma and caught a momentary glimpse of birds, slinking swiftly from view with outstretched necks and trailing tails, or hurling themselves headlong into the underbrush. There is no dignity in such birds in the loose, undesirable meaning of the word as we use it, but there is caste, high caste, the feeling of undefiled lineage, untainted by the degeneracy of a captive strain.

The flight of wild Junglefowl is direct and swift. When amid dense undergrowth they are able to rise almost vertically until clear of the vegetation and then fly strongly to a neighbouring tree. This is their procedure when escaping from a sudden rush of dogs, but they discriminate sharply if men disturb them, and without pause fly as rapidly as possible out of sight, if on a slope invariably downhill. I once saw a cock fly across a valley some half-mile in width, and as long as it remained in sight the flight was as strong as a pheasant's, a number of quick wing-beats being followed by a few seconds of scaling. Ordinarily where the bird is in sight from its rise until it alights, especially if its course, as usual, be downward, the wing-beats are rapid and continuous at first, while the latter half of the flight consists wholly of a motionless scaling with bowed wings.

This facility of flight seems all the more striking when we see it displayed by the village fowls of many parts of the East. When, in riding over the trails or Government roads in the Malay States, one comes suddenly upon a group of fowls, instead of blundering ahead or with frightened squawks and frantic, awkward beating of wings flopping toward their native coops, they often rise swiftly, and with the greatest ease fly out over the steep slope, all together like a flock of doves, then circle around and come back to the road some distance behind. This reveals clearly the recent admixture of wild blood, and is correlated with a much lower fertility than exists among more carefully-bred domestic strains.

DAILY ROUND OF LIFE

The food of Junglefowl, in keeping with their other rather generalized habits, is of an omnivorous character. They are, however, graminivorous on the whole, and in the crops of birds which I have shot at a considerable distance from cultivation I have always found vegetable matter predominating. Small nuts and seeds of unknown plants are often taken in considerable quantities, besides which the young shoots of bamboo and other grasses, leaves, petals and wild seeds of all kinds are eaten. As with all other pheasants, the larvae and eggs of white ants or termites are enjoyed, and the birds will go to considerable trouble to scratch and peck away the hard earthen tunnels and mounds of these insects to expose the nurseries with their abundant tenants. A certain discrimination seems to be exerted in the choice of pebbles, which are swallowed, and the gizzard is often partly filled with bright and shining bits of stone. Seventeen sapphires have been taken from a single hen Junglefowl.

The greater number of birds which make their home in the immediate vicinity of native villages and cultivated fields lose no opportunity to make the most of such advantages. Associating so freely with the domestic fowls, they are thus protected to a great extent from direct attack with guns and traps, the natives not wishing to sacrifice their own useful fowls. After the harvest has been gathered, Junglefowl in early morning or late evening may be seen gleaning in the grain-fields, in loose flocks of ten to twenty birds. The damage they do, however, is not great, and their wariness makes it an easy matter to drive them from the fields.

Besides fattening on the millet and rice when these grains become ripe, Junglefowl share throughout the year the habits of domestic birds in haunting cow-sheds, and the sign of animals which travel over the jungle roads and trails. The easiest way to catch at least a glimpse of these birds in any locality which they are known to inhabit is to walk quietly along the roads near the forests in the cool of early morning. Even where wild cocks and hens form close associations with domestic birds they usually keep to their feral habits in the matter of feeding. In the higher parts of their range in the Himalayas they may occasionally be seen at midday with the village fowls. But this is very unusual, and the early morning and the evening are the only times when, throughout their range in general, they are seen feeding. During the heat of the day they retire to the deepest, coolest shade in the vicinity, and during this time can only be discovered or dislodged by a dog, or by the accident of stumbling upon them. At such a time they are very disinclined to take to wing, and unless actually forced to fly they invariably make their escape by swift running and dodging around and through the undergrowth.

ROOSTING- AND FEEDING-PLACES OF THE RED JUNGLEFOWL

These birds roost high up, often on the half-bent curve of a tall bamboo, whose smooth stem ensures safety from arboreal carnivores. As many as thirty birds have been seen roosting close together.

Just as tame fowl are fond of the company of barn-yard cows, so the wild Red Junglefowl are often seen in the vicinity of wild cattle, and I have seen them again and again feeding about buffalo wallows. It is almost impossible to flush these birds. They invariably choose to escape by running swiftly away, yet, when surprised by a dog, they have the ability of rising as quickly and strongly as partridges.

ROOSTING AND FEEDING PLACES OF THE RED JUNGLEFOWL.

Unlike a number of the true pheasants, Junglefowl are essentially gregarious in their roosting. In Tenasserim this seems to be carried to the extreme, as the following note suggests: "On one occasion, near Pahpoon, I counted thirty males and females seated side by side on one enormous bent bamboo. Mr. Hildebrande was with me, or I should not have ventured to record the fact. I counted them carefully through my binoculars. They were at the other side of the Younzaleen, I guessed about seventy yards off; I loaded a large duck-gun with big shot, fired at the lot and—apparently did not touch one."—(Davison, in Hume's "Game-birds," I., p. 225.)

When watching a small flock of bronze-tailed peacock pheasants in Pahang, I saw four Junglefowl go to roost across a deep, narrow mountain valley. Although within easy shot they did not mind my presence, apparently considering that my only method of attack was to descend and ascend the extremely deep and steep slopes. They had chosen a stubby tree growing obliquely out of the cliff side and directly overhanging the great depth beneath. Far down below the water could be heard, and high overhead the wind was raging, but the four birds crept silently along branch after branch, ascending slowly until they reached one which was protected by an overhanging mass of foliage and vines, and here, after a prolonged scrutiny of me, they settled down close together; a family evidently, cock and hen and two nearly grown young birds. Twice I have known of cocks roosting singly, night after night in the same place, but in both cases the hen was sitting on her eggs near by. I do not think the cocks often crow from their roosts before they descend in the morning. The several times that I have surprised birds as they sent forth their challenge, it has been uttered either from the ground, a fallen log or a low perch other than their regular roost. When they begin their evening calling, they are usually upon the ground, and the crow is certainly not uttered after they have retired to their roost.

The roosting-place most often chosen is near the top of a horizonally bent bamboo, a position liable to sway wildly in a wind, and, one would think, offering but a poor foothold at the best. It must, however, be as safe a place as could be selected, few creatures being able to climb the thick, smooth butts of the stems. When an ordinary tree is utilized, its position, either isolated in the jungle, or, as I have described, overhanging a deep chasm, aids in making the roosting-place less liable to direct attack from creatures of the night. That most excellent observer, Mr. Osmaston, writes me that "usually several birds roost fairly close together in one or in adjacent trees." In countries other than Garhwal, all I have seen were grouped in one tree, sitting as close to one another on the same branch as they could crowd.

The only intimacies which I have observed in the life of these birds are with their domestic kindred of the villages. In regard to this relationship I shall have more to say farther on. With this exception, I have observed only the casual company of babblers, who sometimes accompany the Junglefowl down a long slope on their way to water, and are ever ready to sound the alarm when their keen eyes and more elevated position have enabled them to detect one's presence.

Their enemies vary, of course, with the locality, but members of the mink family, the smaller cats (such as *Felis chaus*), hawks and eagles are unquestionably the greatest dangers with which these birds have to contend. In all my watching, I never observed a tragedy, although more than once I saw individuals suddenly terrified by some menace concealed from my point of view. Mankind is probably the bird's greatest enemy at present, in spite of the fact that the great majority of the individuals which live in his vicinity are becoming tainted with domestic blood.

The senses of sight and hearing are those which protect the Junglefowl from its enemies, the former dominant, while the ears are yet so keenly attuned that the least crack of a twig will often send the bird in headlong flight. Never have I seen a wild bird off its guard for a moment, and although I have lain prone and had a cock come within ten feet, yet it was only because I was perfectly hidden and motionless. On this and on other occasions I have seen the bird under observation become suspicious, and even finally take alarm when I was absolutely certain that through none of its five senses had it received warning of my presence. There seemed to be an intuition, a mental sensing of concealed danger, an indefinite conviction which gradually increased in power and assumed control of the bird's emotions, in spite of the fact that it had as yet no knowledge of the location or character of the peril. In such case it was as likely to make its escape by passing close to my concealed position as in the opposite direction.

On the general character of the country, the lay of the land and the type of vegetation, as well as the suddenness and degree of extremity of attack, the mode of escape depends. When surprised by dogs or suddenly come upon by a man, especially when a steep, open hillside or plain lies ahead, the birds rise at once and with strong wing-beats swiftly skim down the slope. Where only a dog is concerned, they take to the nearest trees, crane their necks down at their disturber and cackle querulously and noisily. When taking to wing, no utterance other than a sudden terrified cackle is given. But there is no hint of the weak muscles of the barnyard degenerate, and I have told already how they have the power of mounting some distance almost vertically to clear themselves of surrounding dense vegetation.

If conditions are right they are as ready to escape on foot, running with head and tail low, with long, swift strides which take them almost instantly from view. They are adepts at dodging, and in an almost open field I have seen a cock dash into the shelter of a bush so quickly that the eye could hardly follow. Waiting a favourable opportunity it would make a dash for another clump of foliage, and so on, until the shelter of the jungle was reached. I have seen nearly grown birds, which were not accompanied by their parents, squat, and once I think a solitary hen bird adopted the same tactics until she made certain that I was approaching, when she fled at full speed. I have never seen even an attempt at crouching in his tracks on the part of a cock.

Of considerable interest is the fact recorded by several reliable observers that the hen with chickens will act like a wounded bird, as in the case of the ruffed grouse and many other species. Osmaston writes me: "The hen simulates a wounded condition, whilst the young crouch motionless and are almost impossible to discover among dead leaves." This act seems best interpreted on the whole as an involuntary convulsion of fear; since we can hardly credit the bird with even an instinctive mimetic intention; and certainly not with a conscious desire to reproduce the actions and postures of an injured and dying bird, which she herself has very probably never had the opportunity of witnessing. Natural selection, I think, can easily explain the development of this phenomenon, while at the same time I wish to give full credit to the bird for sheer bravery and extreme parental devotion. For while the action in itself may not be voluntary, yet when it has failed, and the bird, as I have seen in the case of many species, realizes that the danger is becoming acute, and she returns and actually buffets the assailant—this, it seems to me, rises to the level of voluntary initiative. The spasm has passed, and the bird, with all the strength and power in her body, strives to divert attack from her offspring.

I have never observed even a trace of this simulation of disability on the part of domestic hens, so this must be a very recent acquisition in the Junglefowl, whereas we all know of a hen's conscious bravery in the face of attack by hawk or dog. In domesticity this latter trait is evidently of value, while the other ruse, like the power of strong flight, is unnecessary, and hence has degenerated and been lost.

We have seen that the distribution of the Red Junglefowl has been considerably increased through the agency of man. Swinhoe has given us an account of his finding the bird in the Island of Hainan.

"I fully believed that Hainan would yield a pheasant of some kind, and I never ceased inquiring of the natives whether 'Hill-fowl' (the usual expression for pheasants) were found among their woods. The reply was in the affirmative, and I eagerly looked out for them. Judge my disgust, then, when I discovered that the wonderful 'Hill-fowl' was only a wretched Junglecock. Though greatly disappointed, in heart I was still pleased to make the acquaintance of a bird that I had not met before. On the 18th of February I was rambling in the early morning at Shuy-wei-sze (Central Hainan), and stepped through a hedge into a field, at the further end of which was growing a patch of sweet potatoes. A rustic who was with me pulled me by the sleeve and cried 'Twa-kai' (Hill-fowl). I turned, expecting of course to see a pheasant. The clodhopper was pointing at an ordinary-looking rooster standing in the middle of the field with body erect and tail decumbent. Seeing me take no notice, the native cried out again, 'Shoot, it is a wild bird, and not a barn-door fowl.' I looked again and saw the bird moving away behind a hedge. When I got in view of him again, he ran for the hedge with all speed. There was no waddle in his gait, and I then saw that it was a wild bird. I fired and ran up. The wounded bird flapped and tumbled about precisely as a cock does when its neck is broken and it is thrown down to die. My heart misgave me; I thought I had shot some poor peasant's fowl; but I was wrong—every one I met told me that it was a genuine wild fowl, and on carefully examining it I found it to be so. Unfortunately neither its hackles nor its tail were fully developed. Its comb was small, and its spurs wart-like. Its iris was orange-yellow. Skin under the ear cream-white, purplish pink at its forward corner. Bill ochreous, brown on culmen. Legs brownish-grey, tinged with purple. Its intestines measured 3·5 feet; and its stomach contained sweet potatoes, vetches, and stone-grits. Its flesh was juicy and delicious eating, and quite different in flavour from that of the Barn-door. Its *testes* were of an enormous size; so that there can be no doubt the bird was breeding. On the 27th of February I visited the same field again; and on the same spot where I first saw the cock, appeared the hen. Several natives were with me. They shouted, 'Hó hó Taw-kai' (look, look! Hill-bird); and at the noise the hen rushed into the hedge, and we tried to beat her out in vain. She seemed to be of a deep brown colour, and in running kept her head low and her tail partly erect.

"At Lingshuy (S.E. Hainan) we found grave-mounds on the edge of the jungle strewn with cocks' feathers, as if the wild fowl were in the habit of meeting on the mounds to fight. At Yu-lin-kan (S. Hainan) I heard them repeatedly chuckling in the jungle quite close to me; but there was no getting a shot at them. In the dense woods about Nychow (S. Hainan) they were particularly common, and we heard and saw them often. When put up in the open, they make at once for the covert, flying heavily, with the body and tail nearly perpendicular. I saw a Le man put a cock bird up; and marking it drop into the wood, I hastened to the spot. It gave a crow, 'Tok-tok tok tok chea'—as a domestic hen does when frightened. My follower raised it from the thick bush with a stone; it flew a short distance, and fell again into the thicket. Our party returned to the boat without a Junglefowl, and we saw no more of them in the course of our cruise."

HOME LIFE

The breeding season of the Red Junglefowl in the northern sub-Himalayan part of their range extends from February, when the males begin their challenging, combats and courtship, until the end of May, when the few hardy individuals which make their home well up in the hills, deposit their eggs. In central Burma eggs have been taken from March to June. As we follow the birds southward throughout their range, there is, as usual among birds in general, an increasing laxity in the precise limits of the nesting months, and in the Malay Peninsula young birds have been recorded from February to late August.

In the first few pages of this monograph I have mentioned the courtship of the wild Red Junglefowl. Even in the degenerate domesticated rooster we still see hints of this feral chivalry, but as with flight and many habits of life this centuries-old inmate of our barn-yards has let his manners become sadly slipshod. Too often his procedure is to sidle up to a hen, and make only one or two half-hearted circlings, with wing awkwardly drooped, an atavistic effort to reveal beauties of plumage which are no longer his. Then if the hen, obeying her innate impulse, shows but slight interest, his patience is at an end, and the courtship degenerates into a mere rough-and-tumble pursuit and capture by sheer force. We see much the same thing in the house sparrow.

One noteworthy thing about the courtship of the domestic cock is the rattling croak or harsh crooning sound he often makes when going through the display. The wild birds are absolutely silent when they are courting, uttering a cluck now and then between displays, but giving no hint of the rather coarse garrulity which characterizes their captive relation.

The little definite information we have of wild birds shows that Junglefowl differ in no way from pheasants in general in the reliance they place in persistent showing off to produce some effect on the hens. Hypnotic rather than sentimental though this probably is, yet it is an effect gained solely through emotional channels. The manœuvres themselves are not of the highest order, corresponding to the first stage —the lateral display—of such birds as peacock pheasants and tragopans.

The assertion has been often made and with some truth that some of the courtship attitudes are similar to those assumed in fighting, the intention of the assertion being to belittle any specialized effort on the part of the male to catch directly the eye of the hen. This statement is now quoted and repeated in the most sweeping manner by every dilettante writer on birds, until it requires some refutation to bring it within logical bounds. The lateral display of the Junglefowl has nothing to do with the fighting position of these birds, which is essentially frontal. Even when two cocks are approaching one another and circling for an opening, the resemblance between the two motor phenomena is extremely remote.

The nodes of brilliant plumage in the wild Junglecock are on the back, wings and tail. Hence it is these areas which are of prime importance in courtship display. The dull under-parts are concealed. The bird endeavours to manœuvre into a position almost in front of the hen, and then to render himself as asymmetrical as possible. The inner wing and tail is spread and lowered almost or quite to the ground. The back is slanted and the inner side depressed as much as possible. The hackles are raised and spread a little, hanging far down on the side toward the hen. When the extreme posture is assumed, the bird takes short, rapid steps in a half circle, bringing up on the opposite side. After a few seconds of quiet, he may retrace his steps and make a return circle, displaying the beauties of the opposite side, or, if the hen has advanced, he may walk quietly around behind her and display again from the same side. In any case we are reminded strongly of the display of the golden pheasant. I have seen this courtship on the part of a wild bird, when it had no inkling of my presence, and although I have watched many domestic cocks going through the same performance, it has, even at its best, lacked the patience, the thoroughness and the vigour of the courtship of the wild bird.

Junglefowl are notoriously pugnacious. This is attested by the great length of spurs and indirectly by the hackles, which appear to function especially as a protective ruff or a false shield. The beak-to-beak position of the fighting birds is well known to every one, and at such a time the hackles are erected until they form a perfect halo about the head, hiding from view all the vulnerable parts of the body.

Hume has an interesting note about the combats and fighting arenas of wild Junglecocks. He says, "No one especially notices the extreme pugnacity of these birds in the wild state, or the fact that where they are numerous they select regular fighting-grounds much like ruffs.

"Going through the forests of the Siwaliks, in the north-eastern portion of the Saharanpur district, I chanced one afternoon, late in March, on a tiny open grassy knoll, perhaps ten yards in diameter and a yard in height. It was covered with close turf, scratched in many places into holes, and covered over with Junglefowl feathers to such an extent that I thought some Bonelli's eagle, a great enemy of this species, must have caught and devoured one. Whilst I was looking round, one of my dogs brought me from somewhere in the jungle round a freshly-killed Junglecock, in splendid plumage, but with the base of the skull on one side pierced by what I at once concluded must have been the spur of another cock. I put up for the day at a Bunjara Perow, some two miles distant, and on speaking to the men, found that they knew the place well, and one of them said that he had repeatedly watched the cocks fighting there, and that he would take me to a tree close by whence I could see it for myself. Long before daylight he guided me to the tree, telling me to climb to the fourth fork, whence, quite concealed, I could look down on the mound. When I got up it was too dark to see anything, but a glimmer of dawn soon stole into the eastern sky, which I faced; soon after crowing began all round, then I made out the mound dimly, perhaps thirty yards from the base of the tree, and forty from my perch; then it got quite light, and a few minutes later a Junglecock ran out on to the top of the mound and crowed (for a wild bird) vociferously, clapping his wings, and strutting round and round, with his tail raised almost like a domestic fowl.

"And here I should notice that although, as has often been noticed, the wild cocks always droop their tails when running away or feeding—in fact almost whenever you see them—yet I believe, from what I then and once subsequently saw, that, when challenging rivals, they probably always erect the tail, and I know (having twice so surprised them before they saw me, when watching for cheetul and sambhur from a *machán*, near water in the early morning) that when paying their addresses to their mates they do the same during the preliminary struts round them.

"I learnt so much and no more; there was a rush, a yelp; the Junglecock had vanished, and I found that one of my wretched dogs had got loose, tracked me, and was now careering wildly about the foot of the tree.

"Next day I tried again, but without success. I suppose the birds about had been too much scared by the dog, and I had to leave the place without seeing a fight there; but putting all the facts together, I have not the smallest doubt that this was a real fighting arena, and that, as the Bunjara averred, many of the innumerable cocks in the neighbourhood did systematically fight there.

"Only a week later I shot two cocks, who were tumbling head over heels, a confused mass, with wings and legs interlaced in an incredible manner, and on several other occasions, when watching and waiting, concealed and in silence, for larger game, I had witnessed desperate battles between cocks who happened to meet, attracted by each other's crows and flappings of wings, near my tree ambush."

I have never been fortunate enough to see two wild cocks fighting, but I have three separate times chanced upon what appeared to be fighting-places. In all cases these were in small glades in bamboo jungle, and in one instance a half-decomposed cock bird was lying in the centre. On two other occasions I have found where a Junglefowl had been plucked and doubtless eaten by an eagle or owl, and there was no doubt as to the distinction between the two situations. The widespread abundance of hackles and body feathers, the tracks, the sign, all indicated a much-frequented arena. My attention was attracted to two of the three places by the constant crowing in early morning, and this crowing did not die out little by little, with longer and longer intervals between the challenges, but suddenly, with suggestive abruptness, as might occur if a rival appeared on the scene. I believe that the combatants in these places are chiefly young or unmated birds, and that hens are to be found somewhere in the vicinity, although my belief in this is based chiefly on my observations of other species of Junglefowl. The mated birds keep together and do not range far afield, and in their case combats are probably confined to encounters with trespassing strange males.

A fact of passing interest, which I shall touch upon in more detail elsewhere, is the isolation and accentuation by breeders of the mental character of combativeness. The mentality of the domestic game-cock is as much a product of artificial selection as is the physical character of a crest in the Polish fowl and the physiological function of increased fertility.

In spite of many exceptions, I believe that the normal, or at least the much more common state of mated life among Red Junglefowl is that of monogamy. Birds living in open jungle, isolated from the fowls of natives, are almost invariably seen in pairs, except when families are flocked together, and several sportsmen who have hunted this bird emphasize this fact. In more than one instance where I have found a single cock associated with several hens, it has been in the immediate vicinity of villages, and I credit this apparent polygamy to the influence of native fowl blood. Among domestic birds polygamy is, of course, the rule. Just as the power of flight and speed has degenerated in our barnyard fowls, so the normal pairing relation has been upset, and mating is indiscriminate and all but lacking in courtship.

The site chosen for the nest is again, to a certain extent, an index of the absolutely feral nature of each respective pair of Junglefowls, or reveals the demoralizing effect of crossing with native birds. Twice in widely separated countries I have discovered, with the aid of expert native hunters, far from human habitation, the nests of wild hens. They were hidden deep in thickets, and protected by a very dense growth of bamboo in one case, and brake in the other. There would have been no possibility of discovery except by the accidental flushing of the hen. In four instances of nests near villages, on the other hand, none were thoroughly concealed, and in two cases it was impossible to decide whether or not the nests were those of extremely wild native hens or rather tame feral jungle birds.

The nest is, of course, on the ground, usually well toward the centre or denser portion of a thicket, usually of bamboo. It is variable as to character; sometimes merely a hollow scratched out of the earth, without any lining; again the leaves which were already on the ground remain, and are matted down by the eggs and pressure of the bird's body. More rarely a considerable heap of grass and leaves is collected, forming a real nest, unlike the case of most of the pheasants. Another variation which has been described is where the bird, beside making a nesting hollow, also scrapes up the earth outside and around this nest, thus forming an appreciable rim, which protects the contents, keeping the lining firm and the eggs secure.

Hume speaks of finding a Junglefowl's nest almost every day during a month's shooting in May along the southern slopes of the Siwaliks, with the aid of dogs and men. Once six were found near the Bhing-ka-khol within a radius of two hundred yards.

The time of year of laying and the altitudinal range within which breeding takes place have already been discussed. The number of eggs is not very constant, but five to eight is the usual number. Eleven have been known to be deposited by a single hen at one laying, but the record of a nestful of fourteen probably represents the joint efforts of two birds.

In appearance the eggs are, of course, like miniature hens' eggs. The shell is smooth and fine of texture, with considerable gloss. Near native villages the shells partake of the character of those of the domestic birds. Usually they are of a pale buff or yellowish *café au lait* colour, sometimes paler, whiter, or again darker. In length they vary from 40 to 53 mm.; and in breadth from 32 to 39. The average Red Junglefowl egg measures 46 by 35 mm.

The period of incubation of Junglefowl is the same as in their domestic descendants, about twenty-one days, and the chicks are strong and very wild, able to leave the nest, to follow the parent and to hide at her command almost as soon as their down is dry. When the eggs of really wild birds are hatched under domestic hens, and the chicks are confined with other fowls, they will accept captivity in the end, and will remain and breed. But they always choose to roost in trees adjacent to or within the village, rather than spend the nights in coops, or on the rafters, or under the floor-beams of the Burmese or Malayan houses. If, however, the chicks are permitted at once to run in the jungle, they will drift away from the hen, and through fear will one by one be lost. Nevertheless, I repeat that it is most interesting that the chicks, or even the adults of real feral Red Junglefowl, unlike the other closely related species of Gallus, are susceptible of what is practically domestication in one generation, unlike any other member of the pheasant family. In this it parallels the mallard duck, and to a less extent certain South American birds, such as the trumpeters, cariamas, and chachalacas. These latter, however, refuse to breed in captivity, but within the space of their own life-time become perfectly tame, and accept man as protector and friend while enjoying full liberty at the very edge of their native jungle.

The call-notes of the chicks and the warning and calls of the hens differ but little from the corresponding utterances of domestic birds. The cock, as far as I know, never goes near the nest, nor does he take any part in incubation, although he is frequently seen in association with the hen when she goes off to feed. When the brood is hatched, or at least when the chicks are a week or more old, the cock is found with them, scratching and helping to find food. This I have verified personally. When alarmed, however, he is the first to dash away, carrying out the rule of pheasants in general, that susceptibility to suspicion, fear, and flight is in direct relation to the excess of colour or conspicuousness of plumage. When threatened with danger the hen leaves her brood with a single cackle, sharp and incisive, which sends every chick to cover, where they remain motionless until they hear her reassuring notes. I once was fortunate enough to have a hen and her brood of four young pass close beneath the tree in which I was concealed on the watch for fireback pheasants. Some animal of which I could not catch a glimpse rushed suddenly through the ferns near by, and the hen rose and whirred swiftly into the jungle in the opposite direction. By my watch, over twelve minutes passed before the bird reappeared, although after the first rush there was no further hint of danger. Then she came silently, cautiously, picking her way back through the underbrush, strangely enough from the side whence the sound had come, having described a hemicircle in her flight and return. When a few feet away she uttered several low crooning notes, walking slowly, and before she disappeared I made out the forms of several of the little chicks. Where they had been or when they answered her reassuring call, I could not tell. Their markings and colours were perfectly protective; when motionless they were bits of the jungle floor mosaic of various pigments, lights and shadows, and with no tell-tale scents to betray them, were safe from all discovery during the absence of the mother.

In the crop of a two weeks' chick I found a bit of a scarlet earthworm, several small grubs, and a piece of grass blade. Beyond this I have no data as to the food of the young birds. Judging from the scratching proclivities of both sexes, I believe that insects form an important part of their food. As I know that the cocks share in the defence and feeding of the brood, it is reasonable to suppose that he roosts with them from the time when they are first able to flutter up to a limb. Certainly when they are half grown he is found with them or on a neighbouring branch every night. The dangers to which the eggs and very young chicks are subject are those which ever threaten ground-nesting birds; snakes, lizards, small carnivores, and other predaceous mammals, and the small, jungle-frequenting hawks and owls being the worst.

RELATION TO MAN

The details of the past and present relation which obtains between the Red Junglefowl through its descendants and mankind, could easily be elaborated into an entire volume of this monograph. In economic importance the domestic fowl takes rank with the cow, sheep and pig. Many accounts have been written on this subject, one of the best still being Darwin's chapter published more than forty-five years ago.

Sometime in the far distant past, exactly when we shall probably never know, some primitive race of mankind captured living Junglefowl and tamed them. The birds learned that intimate association with man ensured comparative freedom from attack by beasts of the jungle and a more or less regular supply of food. Certainly their lives are a great deal longer than among their wild kindred. There are records of domestic cocks twenty-four, twenty-five and even thirty years old. So in numberless races and varieties we find the domestic fowl as the companion of man distributed over the whole world, with the exception of the high mountains and the polar regions, where it is infertile, and, therefore, cannot be bred. It everywhere betrays its southern origin by its love for warm, sunny places, its dislike of cold, and the infertility in chilly regions above mentioned. The early history of mankind and the fowl, as far as we know it, I have detailed elsewhere.

After the first domestication, and throughout succeeding years, during generation after generation, these tamed fowls of the jungle made three separate appeals to man. First, he reared them and found their flesh and eggs goodly food, and little by little learned to breed birds which either were large in size, and thus produced an unusual amount of flesh, or by selection, increased feeding, and in other ways brought about an enormously increased egg productivity. In the second place the natural pugnacity of these birds appealed to the primitive instincts of savage man, and many generations of him must have given much thought to the sport of cock-fighting to have brought into existence the specialized race of game-cocks with its peculiar structure and abnormal pugnacity. Thirdly, when the plasticity of form and structure of Junglefowl bred in captivity became evident through the variation of successive generations, the aesthetic side of mankind seized upon this as a sort of living, organic potter's clay, and with this material, breeders and fanciers from early in human history to the latest exhibitors at our modern poultry shows have exercised their ingenuity in the production of beautiful, bizarre or monstrous races of domestic fowls. All this is of interest to us only as showing the possibilities inherent in a species of wild bird when it has become adapted to domestication. Emulation and competition have become so great that in England alone, twenty poultry shows are sometimes held within the space of a week, and prize fowls may fetch at auction from five hundred to seven hundred and fifty dollars.

The plasticity of domestic fowls is very remarkable, and has furnished the mutationists with considerable evidence. The unnatural conditions of their lives, however, doubtless accounts for much of this, and in Nature, for example, among feral Junglefowl there is unquestionably much less of this abnormal variation. Davenport says (chapter on Mutation in "Fifty Years of Darwinism," 1909, p. 171) that within a period of four years "in the egg, unhatched, I have obtained Siamese twins, anteriorly duplex individuals with shortened upper jaw . . . and chicks with thigh-bones absent. There have been reared chicks with toes grown together by a web, without toenail, or with two toenails on one toe; with five toes, six toes, seven toes, or three toes; with one wing lacking or both absent; with two pairs of spurs; without oil-gland or tail (though from tailed ancestry); with neck nearly devoid of feathers; with cerebral hernia and a great crest; with feather-shaft curved; with barbs twisted and dicotomously branched, or lacking altogether. Of the comb alone I have a score of forms: single, double, triple, quintuple and walnut, V-shaped, cup-shaped, comprising two horns, or four or six, absent posteriorly, absent anteriorly, and absent altogether." And in addition to the increase in egg production, of which we shall speak shortly, we find eggs varying much in colour, and of all sizes and shapes, from sausage-like to a complete horseshoe. Some of these abnormalities are very patently, wholly inimical to the life of the organism, but others have been developed and increased by selection until they have come to be characteristic of races and breeds known over all the world.

Game fowls are more like wild Red Junglefowl than any other domestic race, differing chiefly in being larger and in carrying the tail more erect. When these birds were bred for fighting only, the general proportions of the wild Junglefowl were not departed from, but in recent years, stimulated by the desire to excel in competitive poultry shows, breeders have wrought remarkable changes in this race, especially as to extreme length of neck and legs. Within a comparatively short time birds had been evolved with the breast over a foot from the ground. The sickle feathers of the tail have been shortened, and the entire plumage rendered firm and closely pressed to the body. These abnormal proportions, of course, unfit the birds for fighting. On the other hand, as in many other races, one strain of the original type of game bird has been reduced in size through selective breeding, and game bantams of exceedingly small size have been produced. In this race as a whole there is a curious tendency towards the assumption of female plumage by the cock, and such breeds are known as "henny" game.

Years ago Temminck gave the name *Gallus giganteus* to a fowl of great size from the Malay States. This is now well known as a race appropriately called Malays, which are much larger than the game, and with very long and heavy legs. In fact so disproportionately long are these limbs that the bird often rests its entire tarsus upon the ground, looking like a cassowary, or, with the tail-feathers trailing, actually like a kangaroo. The plumage is so scanty that on the neck, breast and legs the skin shows through in many places as patches of bright red, this colour being apparently the effect of its direct exposure to light and air. These birds are excellent for table use, having an abundance of fine flavoured flesh, especially on the breast. In the aseel, the pugnacity of the cocks has been handed on, not only to the hens, but even to the chicks, who fight with one another at every opportunity.

The birds known as Cochin China fowls, including brahmas and langshans, have been evolved along lines of great size and weight. Their name is a misnomer, as they originally came from Shanghai. The cocks sometimes reach sixteen or seventeen pounds. The plumage is soft and downy, and the feathering extends down to the toes, the wings and tail being so small as to be wholly functionless. In fact the feathering on the legs and feet has been carried to such an extreme that the normal scalation has given place to almost wing-like masses of quills, six and even eight inches in length. Brahmas did not come from the vicinity of that river, but were produced in the United States, by crossing a variety of Malay fowl with Cochins. By crossing the latter with Dominiques the Plymouth Rock was produced, a very prolific layer.

Spanish fowls have given off leghorns, Andalusians, Minorcas and others. In the black Spanish, the originally small spot of white on the ear lappet has spread over the entire face, and the lappet itself increased in size until it is sometimes seven inches in length and four in width. These birds and their subraces have been bred for egg production, and correlated with this the incubating instinct has been lost. In the place of the nestful of four to eight eggs which their feral ancestor laid once, or at most twice during the season, these domestic egg machines will lay well over two hundred eggs in a year. In Australia, four hundred and fifty hens laid over eighty thousand, nine hundred and fifty eggs, while in America there is a record of a single yard of six hundred fowls which averaged in the year one hundred and ninety-six large, perfect eggs for each bird!

The falsely named Hamburghs and the crested fowls are also non-incubating, abnormal producers of eggs. The combs of the former are double. In the latter, on the contrary, the great development of the crest has almost, and in some cases wholly obliterated the comb. The wattles too are absent in some forms, their places being taken by tufts of feathers. Almost the only changes produced by man in the domesticated races of fowl are those of general proportion and colour. But in the crested fowl the cranium itself has undergone a remarkable change, the front part of the skull forming a prominent rounded swelling, which contains a large part of the brain. Only occasionally is this remarkable structure wholly ossified.

The Dorking fowl has an extra toe on each foot. This is probably a monstrosity and not a reversion to the real pentadactyl foot of the ancestors of birds. In one of the latest contributions (Ghigi, "Sul Significato Morpologico della Polidattilia nei Gallinacei," 1901) to this subject, the author's summary is as follows: "Summing up, it seems to me conclusive that the extra toe of chickens, homologous with that sometimes observed in other birds, must not be attributed to a doubling of the first toe, but to the teralogical development of an organ (*prealluce*) which in the ancestors existed in a rudimentary state."

Sebright bantams are in some ways the most artificial of all domestic breeds, for the cock has completely assumed the characters of the hen. The markings of the plumage, the short, pointed hackles and the short, stiff, central tail-feathers, show an extreme specialization and departure from the ancestral conditions. In the silky fowls, barbicels are almost absent from the feathers, giving the plumage a loose, silky or hair-like texture. In the best-known breed of this race the feathers are pure white, while the skin, the connective tissue separating the muscles and the periosteum covering the bones, are a deep blue-black. When one has travelled in Malaysia and purchased these birds for the first time for the table, the sight of the black tissue on their flesh is most startling. They are nevertheless delicious eating. This character is not appreciated by the general purchaser at home, so these birds have little value for the market. In fact even in crosses with other races, while the silky character of the feather is soon lost, the dark skin and other tissue is dominant and will do much to depreciate the selling value of the crosses.

Frizzled fowl, or "pine-apple hens" as they are called in China, show the character of every feather, even the flight feathers and tail, turning outward from the body. One sees them everywhere in the East, especially in India, and indeed they are adapted only to a warm, dry climate, owing to the lack of protection which their plumage affords, the rain and cold easily reaching their skin. A radical, inheritable alteration of structure is found in the rumpless fowls, in which the coccygeal vertebrae are absent. This character is dominant, so that by crossing, any race of rumpless fowls may be produced. Dumpies or creepers are fowls with legs so short that they can progress only with difficulty. Bantam is a term applied to very diminutive fowls of any race. Even Cochins have been bred down to less than a pound weight. The Japanese have a bantam with enormous tail and comb, very prominent breast and absurdly short legs.

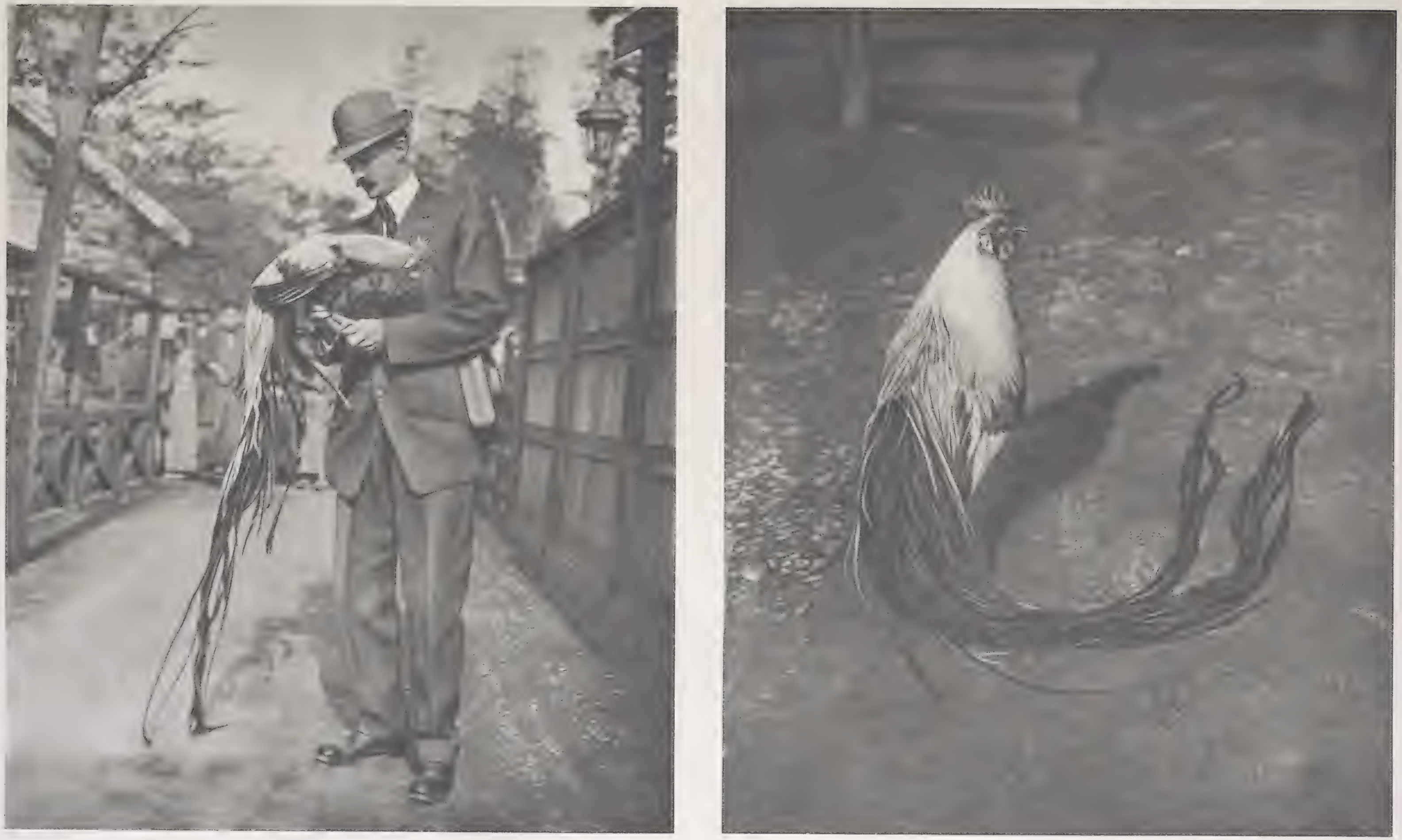
While shape is an easy factor to alter in the breeding of fowls, segregation of colour, unlike the condition existing in doves, offers much greater difficulty. The Japanese bantam is an unusual exception to the possibility of this localization of colour—the bird in general being white, while the tail is black. Darwin accounts for this by what he calls analogous variation, finding its explanation in the patterns and colours, not only of the direct ancestor, but of other members of the genus and related groups. Thus although the wild rock dove has not a white head, other species of doves have, and this character is easy to obtain by selective breeding. A white head is unknown among any species of wild Junglefowl or of pheasants, and a white-headed domestic race has never to my knowledge been obtained.

The long-tailed fowls of Japan are popularly known as Yokohama, or Shinowara or Phoenix Fowls. Much has been written about this breed, and in this literature there is more of error than of truth. Authors have taken as their theses the supposed secret of production of the long tail-feathers by constant stroking and gentle pulling, stimulating in this way the abnormal growth. When one visits the home of these birds in Japan, it is found that such methods exist only in the ingenuity of their Caucasian inventors. As a matter of fact there is no secret connected with these birds, and their great length of feathers is as normal a product of development as the crests of other breeds. It has been proved that constant gentle pulling and stroking of the feathers has a certain effect

JAPANESE LONG-TAILED FOWL

Of all curious breeds of domestic fowl, none are more remarkable than the Japanese birds, whose upper tail-coverts sometimes reach a length of over twenty feet. The feathers are kept wrapped in soft paper, and the birds themselves spend a most uninteresting life in a high, narrow box, fed by hand and cared for by special attendants.

PHOTOGRAVURE PLATE 32



JAPANESE LONG TAILED FOWL.

in making the feather grow somewhat more rapidly, but this is only an unimportant indirect stimulation, not used by the Japanese. The finest specimens come from Shinowara, a small village three miles from Kochi, in the Province of Tosa on the Island of Shikoku. Prof. Ijima of Tokyo University told me that tradition in regard to these fowls goes back many hundred years, but their origin is wrapped in unsolved mystery. It is said that the breed was known in Corea before A.D. 1000. In former years the Japanese breeders were encouraged by the Daimyo or Governor of the Province to produce birds with especially long feathers, as these were of importance in heraldry and also used as spear decorations by high officials. Recently, however, owing to lack of government support and popular interest, the industry is on the wane, as but few purchasers are to be found. At present, a good pair of birds with the cock's feathers six or eight feet long may be purchased for two hundred yen; one hundred dollars in our currency.

For the first two years the birds are kept like ordinary fowls, but after this time the cocks are confined in a narrow box-like cage, on a perch from which they cannot descend nor can they turn around on it. From this time there appears to be no moult of the tail-coverts and central rectrices, and within from four to six years these feathers have attained an enormous length. Cocks are used for breeding only six or seven times, and are then valueless, as their long feathers drop out. This irregularity of moult is the explanation of the phenomenon.

The lower rump feathers sometimes reach a length of three or four feet, while fifteen or twenty of the upper tail-coverts themselves attain a much greater development. The roots of these feathers become correspondingly thicker and stronger as the weight increases. The central sickle-shaped rectrices attain the greatest length, but the remainder of the tail itself is of normal length.

The box in which the bird is confined varies in height according to the length of the feathers. As these increase in length they are carefully wrapped in mulberry paper, thus protecting them from dirt and from any danger of being abraded. The birds are fed with great care on nourishing food, and it is said that under the best treatment a growth of six inches a month has been obtained. The longest recorded feather measured twenty feet and two inches. The bird remains contentedly enough on its perch until taken out for exercise, which, when it approaches relative perfection, is done only every other day. The fowls are very tame, and stalk solemnly about, an attendant holding up their enormous train until they are replaced in their exhibition box. Once or twice a month the bird, together with its tail-feathers, is carefully washed with warm water. I could not learn definitely of its diet, but unhusked rice, cabbage, and other vegetables are given and all the water which the bird will drink. The birds are white and of various colours, but usually of the game type. The hens are very ordinary-looking, and lay about twenty-five or thirty eggs each year. Inbreeding has made this race of fowls exceedingly delicate, and birds under a year old cannot be transported with safety. Second year birds are the best for purchasing, as in older specimens the lengthened feathers render shipment most difficult. The fertility is very low, three fertile eggs out of twenty being considered an excellent average. But within the last few years crossing with black minorcas and white leghorns has been attempted, and the non-moult of the posterior dorsal feathers is found to be a dominant factor in the hybrids, while the evils of inbreeding are banished. One sees traces of long-tailed-fowl blood even in the fowls of Kagoshima, where I saw many cocks walking about whose tail-coverts were so long as to drag for several inches on the ground.

In the Malay States most of the aborigines, even the small nomadic tribes, keep domestic fowls, which they breed and eat. They also occasionally have captive pheasants, but do not eat these, but keep them for barter with the Malays. Any wild Junglefowl, however, which they happen to shoot or snare they consider good food. The usual method of trapping of these natives is to place numerous nooses woven of hair or vegetable fibre on the ground and bait the place with grain.

Another way which I observed at Kuala Tembeling is by means of an *ayam dĕnâk* or decoy bird, usually a hybrid cock or hen tethered near the traps or snares. This same method is used elsewhere in Assam, Siam and the Sundarbans. An open space near the forest is usually selected, the decoy bird tied to a stake and surrounded with open nooses and scattered grain. The challenge of the tame bird, which is trained to call often and loudly, attracts the wild cocks, who rush up to give battle, when they are almost certain to become entangled. Or if a hen approaches, she is attracted by the grain and also falls a victim. In Celebes the decoy fowl is called *wawansal* in the language of the Alfaros, and to catch a Junglefowl in this manner is called *mawansal*. The natives of this island do not attempt to tame the wild-caught birds, but use them only as food.

Still another variation of the decoy trapping is practised in Sulu, where the domestic bird is tethered in the centre of a circle of spring nooses. Many wild birds are thus captured, but only cocks. Even where grain is added to the charm of the calling bird, the females remain aloof.

In northern Burma the bamboo fence traps, with their scores of deadfalls, account for many hundreds of Junglefowl in the course of a year. In other places I have seen separate nooses set for these birds, each attached to a bent sapling and baited with grain.

Besides using decoy birds the Malays imitate the crowing and the flapping of the wings of the Junglecocks, and they taught me so that several times I was able to inveigle the birds close to me by making them think that a challenging bird was concealed in my cover.

It is difficult to say whether Junglefowl in general are decreasing or are at least holding their own. If we consider only the isolated, really pure strains, they are unquestionably becoming fewer in numbers, but those which haunt the vicinity of villages and cultivated districts, although shot frequently and suffering from the many enemies, such as snakes and small carnivores, which make life a burden for the village fowl in India, yet are constantly gaining recruits from the ranks of the domestic birds.

In the reserved forests in the sub-Himalayan region the birds seem to be fully holding their own, as there is little shooting there and the native foresters have little time for snaring and trapping. In these Government Reserves the birds are protected from all shooting from the first day of March to the middle of September. The most common time for Junglefowl drives either on foot or from elephants is from November 1 to the end of February.

To the southward, in the Central Provinces of India, the close season for this species is from March 1 to November 30.

JUNGLEFOWL AS GAME-BIRDS

The ornithologist is indeed rash who ventures to tell in his own words the delight which the sportsman takes in his pursuit of game. Let him, unhampered by scientific fetters, relate what pleasure the wild Red Junglefowl can give to the huntsman, whether he pits his own woodcraft and ability singly against these wary birds or fills his gamebag more easily by the assistance of dogs or a line of native beaters.

"When detached clumps of jungle or small hills occur in a jungly district where these fowls abound, very pretty shooting can be had by driving them by means of dogs and beaters; and in travelling through a forest country, many will always be found near the roads, to which they resort to pick up grain from the droppings of cattle, etc.; dogs will often put them up, when they at once fly on to the nearest trees. Young birds, if kept for a few days, are very excellent eating, having a considerable game flavour."—(Beavan).

"Sometimes when thus beating for Junglefowl you meet with odd surprises. It was in April 1853, in the good old days of palki dâk, from Meerut to Mussooree. Three nights we used to make of it when ladies were of the party, and the close of the second night brought us to the Kheree Dâk Bungalow, in broken jungly ground just south of the Siwâliks. After breakfast I went out to look for Junglefowl, luckily with a rifle (a heavy 2 oz. band spherical ball) in case of seeing cheetul. We beat a lot of low jungle grass and scattered bushes, and I had got a partridge and a Junglehen, when I turned into a very likely-looking nalla, about eighty feet deep, with sloping, well-grassed sides, and at the bottom a narrow, perpendicular-sided water channel about four feet deep and three feet wide, cut through the boulder clay. In this channel I walked, with one or two men along the slopes on either side, and one or two above, all a little behind me. Suddenly there was a shout on my left, and instantly a tremendous grunting. As I seized my rifle from the shikâri behind me, four black heads showed through the grass immediately above me. I could not get out of the wretched water-course, which was nearly up to my armpits, and without one second's hesitation one of the bears (the old female as it proved) came down upon me like a thunderbolt. I got my first barrel off when she was about ten yards from me; the second let itself off as her chest struck the muzzle, and then I was knocked over, half-stunned and nearly crushed to death. I don't know exactly how it all happened, but I found myself on my face, hardly able to breathe; my head, arms, and body pinned down by the massive, motionless (lucky for me) *corpse* of lady Bruin. Seeing that the bear was quite dead, my shikâri and a good pahâri bearer I had soon pulled her off and released me, a mass of blood, a good deal cut and bruised, but not really hurt; my first bullet had gone straight through her from stem to stern (2 oz. hardened bullet and six drams of powder), the other had gone right through the heart and come out behind the ribs on the left side.

"It will be well for griffs (as I then was) to bear in mind that, in the sub-Himalayan ranges, at any rate, where Junglefowl are common, there bears and tigers are not unlikely to be met with, and that they should never beat for Junglefowl in such situations on foot without a rifle in trustworthy hands behind them, and never allow themselves to be caught in such a trap as that in which I had stupidly placed myself.

"In the autumn, after the millet-fields have ripened, they grow very fat on this grain, and the birds of the year are then *really* good eating, but, as a rule, the birds one shoots (be it confessed with shame, for it *ought* to be a close season) from March to June, tiger-shooting in the Terai, when, the day's sport over, one turns homeward towards the tents, are no whit better than ordinary village fowls."—(Hume).

"The best shooting I ever got at this species was at Jalpáigúri, where the nallas, or beds of stream, in the neighbourhood, which are common in that country, and filled with jungle, gave cover to very many of these birds. When put up by beaters they fly out at a considerable pace, and require a good knock-down blow to bag them. They run, too, a great deal. In the Manbhoom district the native shikáris used to get many of them by placing corn near some water in the half-dried-up beds of streams, and then shooting them when they came there both in the early morning and evening to eat and drink."—(Beavan).

"This bird must be sought in all jungly country which is partly cultivated; and where paddy-fields extend in long strips into the forest, two sportsmen walking on each side just within the cover, with a line of beaters between them, can enjoy very pretty shooting. The fowls rise from the stubble and fly into the wood, passing overhead, and the sport resembles pheasant-shooting in England, the flight and size of the birds being pretty similar. When the fields have been cleared of the fowls, the shooting may be continued with success in the woods, if they be pretty open, and the sportsman furnished with spaniels, the sight of which forces the birds to tree, from whence very pretty snap-shots may be obtained, as they will often rest on a high branch till the sportsman has arrived underneath before taking wing again. Both cocks and hens make a desperate cackling and flutter when thus roused up by dogs, and I know of no shooting which requires greater nerve and steadiness. If there are no dogs the birds will not tree, but run slyly and silently along and are seen no more, unless you be mounted on an elephant, when it is easy enough to *pot* them, should you be so minded, as they skulk under the brushwood."—(Col. Tickell).

"In some places, where the borders of the forest are much broken and irregular, and the villagers have cultivation here and there between patches of wood and bushes, I have seen capital bags made by a couple of guns, three or four beaters, and a few bustling spaniels. The plan is this: to beat out strips and patches separately, and make a corner here and there, placing the guns in the first instance between the patch of standing crop about to be beaten and the forest towards which the Junglefowl when flushed are certain to make. The birds, finding their retreat cut off, and pushed hard by men and dogs, are forced to take flight, and when well on the wing offer as fine a shot as a sportsman could desire."—(Capt. Baldwin).

"The Red Junglefowl is found in the Gáro Hills, and in all the Assam plains districts. I shot the bird beyond Sadiya the other day. It is a permanent resident in Assam; it is found in bamboo and tree jungle, and is very often numerous near villages. In the low hills near Súsúng, in the Mymensing district of Bengal, I have had excellent sport with these birds. I had the hills thoroughly beaten by beaters, the guns being carefully posted across the line of flight of the birds. I have shot ten to twelve couple in an hour's shooting in this way. The best time for this sport is just at the season when the cold weather rice crop is ready for the sickle; say, during the month of December and early in January."—(Col. Williamson).

"The best way of shooting these birds here in the Sundarbans is by proceeding morning and evening along the edge of the forest, between it and the rice-fields. The sportsman will thus flush two or three coveys of them, and secure a few brace. The largest bag that could be obtained by a single gun would hardly be more than three or four brace."—(Mr. Rainey).

"The Burmese Junglefowl is similar to those in Assam and over the greater part of India, but perhaps a little smaller. It is a game little fellow, and at times affords excellent sport. I used to take up my position on an elephant and have them beaten up towards me, and once or twice I found them as plentiful as pheasants in a preserve in England. Once on the wing, they are very swift and strong fliers, and require a good blow to knock them over.—(Pollok).

"In Perak I found Junglefowl breeding from March to July; and the young, when three or four weeks old, were capital eating—far better than the full-grown bird, which has but little more game flavour than the ordinary domestic fowl.

"At the first glimmer of daylight, and again towards evening, the Junglecocks may be heard in all directions, crowing loudly, and by very careful stalking may occasionally be got at; but I found far the most successful plan was, either early in the morning, or else about sunset, to sneak quietly along the edges of clearings and patches of cultivation, which at those times the Junglefowl frequent in search of food; and in this way, by dodging from bush to bush, I frequently rendered a good account of them. But it required the most careful stalking, as on the slightest alarm the birds ran into the thick jungle, where it was almost useless to follow them, Once or twice I shot them in thick cover, by letting my dog hunt them up into the trees, which they did not leave till I was within range.

"In Province Wellesley, the Malays decoy Junglefowl by imitating the crowing and flapping of the wings of the cock, when the birds coming to accept the supposed challenge are shot."—(Kelham).

From personal experience in the actual jungle in the Malay States and elsewhere, I can assure the sportsman that hunting the Junglefowl is far from being a simple matter of dogs or beaters. There may be many all around you, and yet if you are not willing to abase yourself to the very earth and stalk them with all the woodcraft which you possess, and then shoot the bird as it stands or perches, you need not expect success. Of the Philippine Junglefowl we read, "They are difficult to shoot, as they are very wary, and I have hunted for hours with birds crowing all about me without getting a shot."

COCK-FIGHTING

Cock-fighting has been carried on through much of the historical period, and the literature of nations contains many interesting accounts of this sport. The mention of one must suffice for us.

The seriousness with which cock-fighting is undertaken by the natives of India is shown by a most interesting and amusing treatise called *Murgh-Nāma*, or "Extract on Cocking" as we might translate it. This was written by Nawāb Yār Muhammad Khān of the Rāmpūr State many years ago, and formed a part of the *Sayd-gāh-i Shawkatī*, an Urdu work on sport. I give a few extracts from this, translated by my friend Lieut.-Colonel D. C. Phillott, for the Asiatic Society of Bengal, the translation being as close as the English language will permit.

"The cocker must know that there are in Hindustan four breeds of fowl. First, there is the *tenī*, or common barn-door fowl, kept for domestic purposes; second, the *ghāgas* or cross between the game-fowl and the *tenī;* third, the *karnātak*, a breed in which the skin, bones, tongue, eyes, and blood are all black; this breed is useless for fighting; and fourth, the *asīl* or Indian game-fowl, which is kept for fighting only.

"The points of the Indian game-cock are: beak white, shanks white, eyes white and blood-shot (if the white of the eye be slightly yellowish it does not signify), the comb of medium size, the jaw and cheeks large and hard and with little flesh, the bones of the neck small, the whole neck being like an iron bar, the pope's nose large, the tail-feathers small, and the jaws and wings not fleshy. Its crow is not as long as that of the barn-door cock. The best breed is obtained from Haiderabad, Deccan.

"When the game-cockerels are a year old, the cocker should keep them apart, feeding them on *bājra* or millet wetted in water. Should *bājra* not be obtainable, he must substitute wheat-flour mixed with butter. In either case he must give them but little water to drink. When the cockerel is in high condition, he must foment it with butter (the hand is warmed before the fire, the palm and fingers dipped in butter and pressed on the joints), and begin feeding it on the yolks of two eggs to begin with. The following is the method of feeding on the yolks of eggs:—

"Take the yolk of one egg, one *tolā* (about 200 grains) of butter, one *māsha* of Sāmbhar salt, and four *māshas* of pepper-corns; mix together and half-fry, and give to the cockerel, giving it water every third or fourth day. This will make it strong and lusty.

"Another receipt. Take the yolks of 200 eggs, of musk 2 *māshas*, of good ambergris 2 *māshas*, of saffron 2 *māshas*, of white-shifted sugars 5 *sers*, of almond kernels 2½ *sers*, of kernels of the Edible Pine 1½ *sers*, of pista kernels 2 *sers*, of walnut kernels 1 *ser*, of butter 6 *sers*, and of fine wheaten flour 5 *sers*. First fry the flour well in the butter, and then cast in the shifted sugar. Next add all the ingredients (with the exception of the saffron), having previously pounded them well. Then add to the mixture the saffron well rubbed down in "*kewra* water." The first day give one *tolā* as a dose, and on the top of that a feed of wheaten flour unmixed with butter, so that the grease may be removed from the cock's throat. Then put on the muzzle, either the leather-muzzle or the string-muzzle (so that it may neither pick up any grit nor drink) and let it loose to exercise itself. There are two times for exercise, first early in the morning till seven o'clock, when the cockerel should be fed, spouted (spouting is spraying the bird with water from the mouth, *à la* a Chinese laundryman) with water, and confined under a square or a round coop. At four o'clock it must be released, spouted as before, and muzzled and freed for exercise till five o'clock. The cock should be studied, to see whether it has increased in strength or not. If the cock is lusty and strong, more *halwā* should be given to it and less flour. If it is not strong and has become fat, it should, at night, be dry-fomented with a pad. If fat has collected on the *langot* (stomach), it must be reduced by dry fomentation, and the cock must be kept confined in a warm place away from cold air. In the morning it should be fought for two *pānī*—[*do pānī:* a match is made for many *pānī* or intervals for rest. The first day, the first *pānī* is 20 minutes, the second 30, the third 40, the fourth 50, and the fifth 60. On the second day (or any *pānī* after the fifth) every *pānī* is 60 minutes. On the first day, the match may commence at any time between two and four o'clock, usually the second hour. On the second day the match must commence at two o'clock. An antagonist failing to come to the scratch when time is called, or, to turn up at the correct time loses a *pānī*. Say A. and B. make a match for five *pānī*. A. sees his cock getting the worst of the encounter; he claims a *pānī*. The fight is stopped for twenty minutes while both pitters spout their cocks, etc. A., however, has now only four *pānī* to his credit, while B. has still five. The cocker who first loses his five *pānī* is counted the loser, and has to pay. Though the duration of each *pānī* is fixed by scale, no limit is fixed for each round in fighting. Written rules are not drawn up; custom alone rules]—with a *dalbā*—[*dalbā* is a weak barn-door cock or an inferior game-cock, kept for a young game-cock to bully. *Chutthā* is a quail kept for a fighting quail to bully]—to see whether it has improved in condition or not. If it has improved, then keep it at this weight and condition. If it has disimproved, fight it again, fat, thin, and medium, and observe in which condition it fights best and keep it in that condition. Every week increase the number of rounds with the *dalbā* by one, till the number of eleven *pānī* is reached, which is called by cockers *lām*.

"An ointment for dressing is compounded—[I have omitted the tedious details of weights and measures (W.B.)]—of zeodary, cassia bark, rennet, pomegranate-rind, white cumin seeds, Indian madder, gall oak, betel-leaf juice, and a 'sufficiency of double-distilled wine.' Grind these all up, beat in the wine and betel-leaf juice and anoint the cock's face.

"Just before battle give a cock the following: syrup of sweet pomegranates, preserved apples and quinces, barberries, cucumber seeds, endine chicory, and *bel* fruit. Grind, add the pomegranate syrup; roll into pills, cover with gold and silver leaf, and give to the cock; after one *ghari* [about half-an-hour] go to the cock-pit and fight your cock. If you find a lack of fire in the cock, give it half a fresh *jalebi* [a sweetmeat made of milk, flour and sugar], pepper-corns, and the egg of a red fowl, mixed with the juice of garlic and the juice of green ginger. Next, tying up the spurs with cloth, and then spouting the bird, make it fight. It then rests with the cocker to make or mar the bird.

"In the author's opinion the best birds have thick, powerful beaks, white, as described above; the eyes white, like lustrous pearls; large jaws and head; a small comb; the *tūtan* bone is conspicuous; the neck short and the neck-bones small, fine, and the ridges small, fleshless, and strong as an iron rod; and the back broad like the stone of a hand-mill; the feathers spotted, and beautiful, like the eye of a peacock's feather. The bird should be handsome, and shapely, and active, and quick as a cobra in movement; and in fighting it should be *hama-gīr* [attacking any part of an adversary's body with the beak], and retiring after a blow, so as to avoid its adversary's counter; and should it receive a blow, it should so retaliate as to lay its adversary at its feet in the throes of death, fluttering as though its throat had been cut.

"To make the young cockerel strong and fit for battle. When the cockerel is four months old the cocker should separate it from the mother and make it familiar with him, and give it daily two almonds mixed with *ātā* [coarse wheaten flour], and feed it on *pilā*, or *sālan* [*sālan*, anything eaten with bread or with rice, and specially vegetables cooked with meat, such as curry, etc. Game-fowls are fed from the hand, and are not allowed to pick up food from the ground, lest the beak should become worn. Some game-fowl were so wedded to the hand that they will starve rather than pick up food from the ground]—etc., *i.e.*, whatever the cocker eats himself, and give it *halwā*, of yolks of eggs.

"In the morning give half a belly-full of the *halwā*, and on the top of it half a belly-full of balls of coarse wheaten flour. After exercising the cock, put on the muzzle, spout water over its face, shampoo (by grasping and pressing all the limbs and joints) with the hand, and confine in a *qalqul* or square coop, releasing it at four in the afternoon. After a time look and see if it is thirsty, and if it is, take it out of the coop and give it water. At four o'clock release it. If it is thirsty it will drink. If it is not thirsty and won't drink, then again spout it and shampoo it, and exercise it for an hour. After that bring it into the house, and confining a hen in a small basket-cage, let loose the cockerel that it may see the hen and run round and round her, and by the exercise increase his strength, but do not let him mate with the hen. After running, lift up the cockerel, and shampoo him. In the evening see whether the cock has digested its food. If it has, then in the evening too give it *halwā*, etc., as before. If, however, the cock has not digested its morning meal, give it a few whole pepper-corns; the cocker had, too, better continue to give it pepper-corns in the evening, and keep it awake by lamp-light for an hour, tickling it under the pope's nose to make it oil itself. Then setting it down on a swing made out of a child's cot, swing it for an hour, or else place it on a perch. Then confine it somewhere in a safe place in a basket-cage. In the morning at prayer-time [*i.e.* about an hour before sunrise] take it out of the coop, give it water to drink, and then spout it, and, putting on the muzzle, let it exercise itself for a full hour. After this feed it. You must gradually increase the amount of *halwā*, and decrease the amount of flour, feeding and treating the bird as already described for forty days. Once a week too, at night, you must foment it with a damp, hot pad, fomenting those parts of the body that have accumulated fat. The places to foment are, first from the head to the neck, or rather to the shoulders, next the two wings on the top, next the thighs inside and outside, also the hip-joints and the loins, and underneath between the legs, omitting the lower stomach, and also the breast. The object of fomenting is to make flesh and joints hard and strong.

"When the cockerel is ten months old, fight it one *pānī* with a *dalbā* of its own age, but first put the muzzle on to the *dalbā*. Afterwards spout and suck the cock's beak and face well, to remove blood-spots, and damp a rag in water and clean the inside of the throat with it."

The *dalbā* is muzzled and hobbled before being pitted against its aristocratic antagonist.

One writer states that a cockerel should not be fought till he is one year old, and that he should then be pitted against one of his own age for five minutes the first day, ten the second, and fifteen the third, and then for as long as desirable; and that at the expiration of the fixed time the birds should be separated and their beaks sucked and blown upon. (If a child falls and hurts itself, Indians generally blow upon the seat of injury with the idea of cooling the spot and lessening the pain.)

"If the jaws be fleshy, or if the wattles are large, and it is desired to remove them, then extract the oil of *bhilāwan* and rub it on the cock's face, and if it please God this defect will be removed and will not return. If the comb is too large and it is desired to cut it off, then, after fighting, cut the comb immediately to the size desired, applying to the wound the white web of a small spider, or else staunch with small feathers plucked from under the cock's wings: until a recovery takes place do not spout the cock. Then take a quarter of a piece of tumeric and add half a nux vomica nut and a little edible lime and heat over the fire, and plaster the mixture thickly on the cock's face; if it is the cold season, keep the cock in the sun, if the hot, in the shade. The cock must not be fed during the day, but in the evening after fomentation, when it should be fed on *halwā* or on bread dipped in fresh milk. In the evening the cock should be fomented with a pad dipped in a liquid decoction.

"After fifteen days, when the cock has recovered from its wound, let it be fought for two *pānī* with the unmuzzled *dalbā*, and act as described above. After twenty-two days let the trainer fight his cock three *pānī* and act as before. After forty days let him fight four *pānī*, and lastly, after an interval, five *pānī*. After fighting five *pānī*, he should foment the cock's face with a small bag of *halwā*, and dipping a pad into the hot liquid application, he should foment the loins, the hip-joints, both the shoulder-joints, the breast, and between the legs as described above. After this evening fomentation, he should feed the cock on *halwā*, or on bread dipped in fresh milk. In the morning he should again foment in the same manner, and, mixing some of the best *missi* in wine, should heat it on the fire and paint the cock's face thickly with it. Increase gradually the number of *pānī* up to eleven, acting as just described. Then fight your cock for a wager with some one, having first put it on dry food, and please God the cock of your antagonist will be unable to face yours.

"Just before fighting your cock, you (being in a state of ceremonial purity) should repeat once into each of its ears the words, "Allah the Immutable," and exhale your breath, and if it please God Most High your cock will never deteriorate.

"Should your cock show signs of flight, then give it this corrective:—

"Musk, *tabāshīr*, small cardamoms; pound and put in a paper. Take of juice of Indian sweet fennel seed two ounces and put it in a vessel. When you see that your cock intends flight, first give it two *māshas* of the powdered medicine, and then two *tolās* of the juice. Your cock will go mad and will never quit the field.

"When you wish to cease fighting your cock, and to pair him with a hen, do so, but pair him with a mature hen, but this must be in the warm days of spring. You must not mate your cock with a young hen."

LEGENDS AND SUPERSTITION

Since the first domestic cock crowed, mankind has admired, hated or feared it, has thought of it with reverence, with dislike or with superstition. We have space for mention of but one or two of the legends which have arisen concerning it.

One Al-Qazwini, who died about 1283, wrote an Arabic work, the *Aja ib-ul-Makhluqat*, or the "World of Wonders," and has this to say about the domestic cock:—

"The cock is the most lustful and vainest of birds. It heralds the dawn. One of the strangest things about it is that it knows the watches of the night, and apportions the times for its night-crowing according to the length or shortness of the nights; for instance, if the night is fifteen hours in length, he crows, at stated intervals, the same number of times as he does in a night of nine hours; and this he does by a God-given instinct. It is related that the Prophet (may the Peace and Blessing of God be upon him) said, 'God the Most High has created a cock beneath His Throne, with wings that can extend beyond the East and the West; and towards dawn he spreads his wings, and flaps them, and raises his voice in praise of Him, crying, "Glory to the Most Holy King," and when he has ceased, all the cocks in the Earth join in returning that cry, flapping their wings in like manner.' It is said that the chief caller-to-prayer amongst the cocks is that breed that has long wattles and a castellated comb. The cock has a sense of jealous honour about his wives, and he is generous to them, and cares for them. It is a belief that, should a man rise from sleep at cock-crow, he will be fresh and bright all day. A white cock puts to flight the lion. The best of cocks is the game-cock. Its points are: a red comb, a thick neck, small and black eyes, sharp claws, a loud cry. A cock is unselfish to his hens; he takes a grain in his beak and casts it to them. It is said that he does this in the time of his youth, when his passions dominate him; but that when he ages he no longer does so. The cock defends his hens from the attack of an enemy, and at night collects them in a safe place and stands guard at the door. They say, too, that the cock lays one egg in his lifetime, called in Arabic *bayzat 'l-'uqr*, and that it is very small. The following lines are by the poet Bashshār:—

"'Thou hast visited me but once in all this time.
Make not thy visit rare like the egg of the cock.'

"It is a belief that one who slaughters a white cock with a divided comb will suffer loss in his possessions and in his house, and also that the Devil never enters a house in which such a cock is to be found. As for the properties of the several parts of the cock, if the comb be dried and pounded and given to drink, bad habits will depart from a man. The smoke of the dried comb of a white or of a red cock does good to a madman. The gall applied as a collyrium to the eyes, cures dimness of sight, or a film over the eye. Some physician has said that the gall must be placed in a silver vessel and used continuously to obtain a cure. Polonias has said that the gall of a cock, mixed with mutton-broth and taken in the morning on a fasting stomach, is a cure for loss of memory. If the wing-bone be bound on one suffering from intermittent fever, the fever will depart. If a rider ties that bone on his loins he will suffer no fatigue. The blood, used as a collyrium, is beneficial for film over the eyes. If the blood drawn in a cock-fight be mixed with food and given to a number of people, it will cause dissension amongst them. If you take a cock's blood and mix it with honey and place it on the fire, the application will increase a man's virility. If you take the dried flesh of a cock and pound it with equal quantities of gall-nuts and sumach, and make pills the size of peas, and administer them with a draught of water to one that has a pain, he will be relieved on the spot. In the stomach of the cock there is a pebble, sometimes sky-blue in colour and sometimes crystal, which, if suspended around the neck of a madman, cures him."

THE COCK IN HUMAN HISTORY

Several years ago I had the enviable opportunity of sharing with Dr. John P. Peters an attempt to trace the relation of the cock to mankind from ancient historical times. There seems little doubt but that the original home or centre of distribution of the Red Junglefowl, the most anciently inhabited part of its present range, lies to the east and south, in the Burmese-Malayan portion of its habitat, rather than further east in China, or to the west in the Indian region. Distributional study of other birds, such as the Himalayan kaleege pheasants, makes it certain that these originated in Southern Burma and have since migrated westward, along an elongated sub-Himalayan finger, as far as Kashmir. The same holds true of a number of other forms of life, both mammalian and avian. There is no doubt that the Red Junglefowl is of tropical or sub-tropical origin. Neither it nor its domesticated descendants can bear extreme cold; and the elaborately specialized exposed comb and wattles could have been evolved only in a warm country. The three other species of Junglefowl are all tropical, and the affinities of the group among the other pheasants are altogether with Southern Chinese and Malayan genera.

Like the mallard duck and the rock dove, the Red Junglefowl has, for times long antedating human history, been a species especially susceptible to domestication, and with early civilizations such as arose in China and India, it is not surprising that domestication and variational breeding began before the proofs of hieroglyphics and written record.

Tradition carries back the domestication of the cock in China to as early as 1400 B.C., and the modern name for the bird, *ki* or *kai*, can be traced to the Chou Dynasty, which extended from 1122 to 249 B.C. In a very ancient dictionary *ki* is defined as "the domestic animal which knows the time." In the *Ir-ya*, a glossary of the time of Confucius, it again is found. While there is evidence that in very early times the cock was an object for sacrifice in China, yet those people were quick to see the utilitarian value of the fowl, and to breed several distinct varieties. The Cochin China fowl is one of the most extreme, mutation-like of the early established breeds.

In India it is necessary to depend upon literary rather than monumental evidence of the early occurrence of the cock. In the Indus period of the Aryan invasion, the time of the Rig Veda, there is no mention of the cock, but about 1000 B.C., when the Aryans had reached the Ganges, in the Atharua and the Yajur Vedas, the cock is well known. This supplements our zoological distribution theory, and also emphasizes the significance of the fact that Solomon's Phœnicians, who found and imported the peacock from that part of India which they could reach by sea, did not find the cock.

In the White Yajur Veda the name of the cock, *kukkuta*, is onomatopoetic. We read, "Then cut a cock whose tongue is sweet with honey; call to us manly vigour; may we with thee in every fight be victors." And a verse attributed to Chānakya, about 320 B.C., says you may learn four things from a cock:—

1. To fight; 2, to get up early; 3, to eat with your family; 4, to protect your spouse when she gets into trouble.

If, as seems certain, the cock moved northward and westward, against the line of Aryan invasion, it should have reached Bactria and Persia at a very early date, and judging by the part which the cock plays in Persian religion and mythology, and the manner of reference to it in Zoroastrian literature, its advent must have antedated considerably 600 B.C.

The first mention of the cock in Grecian literature is by Theognia about 525 B.C., but his image occurs on coins from the temple of Artemis at Ephesus of at least 700 B.C. In the Metropolitan Museum in New York is a Corinthian Alabastron with a well-executed cock, dated 650–600 B.C. As to the Chinese the fowl was primarily an edible bird, and to the Persians an object of sacrifice, so to the later Greeks his fighting qualities appealed strongest. To them he was primarily a game cock, and cock-fights were the commonest representations on coins. While so common during the middle and later periods, the cock does not enter into Greek mythology, neither is it mentioned in either Hesiod or Homer, nor in those widespread legends or folklore tales which originated in the early period of Greek development.

The establishment of the cock in Greece was only a slight advance compared with the steady progress along the line of the Iranian invasion, which carried the bird through Bactria and Persia on into Scythia and Europe, stretching across finally to the British Isles and spreading down from Gaul into Central Italy. Long before Greek colonists carried the bird to south Italy, it had passed on to the northward, and was being carried southward through Italy on the line of an independent advance. The first European distribution of the cock was overland rather than by sea, or by coastal colonists. The Romans found it well established in Gaul, England, and among the Germans. The Greeks knew it as the Persian bird, the Romans called it *gallus* after their return from Gaul. Cæsar tells of the religious significance of the cock among the Gauls and of its religious importance. Indeed we realize that no nation has more right to its national bird than France, by constant association and symbolism from the earliest times down to *le chanticler d'aujourd'hui*, the singer, the herald of the dawn.

The Greeks carried the cock southward to the Phœnician cities, but only at a late date did it become well established on the Syrian mainland. As early as 700 B.C. the Assyrians and Babylonians received the fowl from the Medes and Persians, where it had been known since 1000. We do not know where the Aramæans first obtained the cock —those natives of the lands stretching from the western frontiers of Babylonia to the highlands of western Asia. But from them in the intercourse of later times the cock was introduced to the Jews in Palestine about 200 B.C.

Beside the dove and peacock there is no mention of domesticated fowls in the Old Testament, with one or two very doubtful exceptions. Certainly during all the time covered by that period the cock was quite unknown to the people as a whole. Both the New Testament and the Talmud mention the cock, as in Mark xiii. 35: "Watch ye therefore; for ye know not when the master of the house cometh, at even, or at midnight, or at the cock-crowing, or in the morning." And in Berakhoth 60 b: "Praised be thou, O God, Lord of the world, that gavest understanding to the cock to distinguish between day and night." To-day the cock is the one sacrificial animal of the Jews; at Yom Kippur as an atonement offering—a cock by a man, a hen by a woman. And indeed in ancient Palestine there was at first considerable opposition to the ordinary economic breeding of fowls, by those who considered the birds as special objects of religious significance.

Strangest of all is the historical distribution of the cock in Egypt. The Egyptians, who reached far and wide through their dependencies for strange creatures and objects, whose artists crystallized in exquisite sculptured bas-relief and paintings even the separate species of ducks and geese, doves and quail with which they were familiar, could never have failed to depict the characteristic mien, or the comb, hackles or tail of the cock, had they known that bird. Yet before the Roman period there is no image on Egyptian monuments, nor word or sign for cock in their language. It is strange that no hint of chickens or casual fowls should have been brought by the Persians or the Grecian mercenaries of Psammetichus. However we may fail to explain the silence of all the dynasties, no cock or hen is known to have reached Egypt at an earlier date than 50 B.C.

DETAILED DESCRIPTION

ADULT MALE.—As I have emphasized in the course of narration of this species, the constant interchange of blood, the continued crossing of the wild Red Junglefowl with native birds, has brought about an amount of variation in both habits and coloration which is unique among pheasants. The following descriptions of the birds refer to specimens which appear to be pure-blooded, from birds which were secured at a considerable distance from human habitation.

Top of the head, neck and upper mantle orange red or dark orange, the longer hackles paling posteriorly into orange or orange-yellow. This latter colour is confined to a very wide disintegrated border, the concealed central, solid portions of the vane varying from slightly darker to a smoky brown. These hackles are slender and greatly elongated, covering and concealing the real feathers of the mantle and upper back. Mid-mantle dull brown, sometimes showing a purplish sheen. Lower mantle and lesser coverts glossed with purplish blue or green. A line of feathers bordering the entire ventral border of the hackles, scapulars, central line of the lower back and median wing-coverts rich dark maroon red, shading into orange-red or orange on the long, soft, hackle-like feathers of the sides of the back, rump and upper tail-coverts. Most of the maroon feathers have a concealed zone of iridescent green. Greater primary coverts dull brown; secondary coverts black, strongly glossed with purplish green. Flight feathers brownish black, the outer margin of the primaries pale brownish buff and the outer half of the outer webs of the secondaries chestnut-buff anteriorly, deepening into tawny toward the tips of the feathers. This colour gradually disappears from the inner secondaries, and is replaced on the tertiaries by a gloss of green. Longer upper tail-coverts solidly glossed with green; the central tail-feathers lack this sheen along the shaft and toward the tip, while it dies out on the lateral rectrices, leaving them dull dark brown. There is no green gloss on the underside of any of the feathers. Ventral surface of the neck, breast and all the under parts uniform brownish black, faintly glossed with greenish. A fleshy, bare, deeply notched comb arises from the forehead and crown. There are two rounded gular wattles, and a large lappet growing just beneath the opening of each ear.

The bill is dark brown, sometimes reddish toward the base in full-coloured males, and paler at the tip of the lower mandible. The legs and feet are lead-coloured or slaty, sometimes rather brown, purplish or tinged with greenish, while again they may be pale slaty grey, irrespective of age, sex or locality. Iris light to rather deep orange-red. The bare skin of the sides of the head, skin, throat and upper part of the neck in front, smooth and of varying shades of red. The large erect comb, thin and deeply notched above, and the two gular wattles vary from deep dull red to bright crimson. When a large series of birds with definite locality labels is examined it is evident that the ear lappets tend to be whitish or pinkish-white in Indian birds, and red, like the wattles and comb in birds from Burma and the Malay Peninsula. The proportion is about forty per cent. of each, leaving twenty per cent. which are neutral or actually negative. I have seen many Junglefowl from Pahang, Johore and Java, which had the ear-lappets pearly white, and, on the other hand, I have shot birds in southern Garhwal with the lappets showing no trace of light colour, being indistinguishable in hue from the comb and wattles, even when these were very bright in colour. In northern Burma I have secured two adult Junglecocks feeding together with several hens in a part of the jungle far distant from any native fowl which respectively showed the two extremes in colour of lappets. Where white is present, it is like enamel or polished ivory, and changes to violet or blue where it merges into the red of the face or upper part of the lappet. It is true that Indian birds, especially those from the dryer, semi-arid regions, are noticeably pale, while the Junglefowl from the terai and the Malay States are richer, with the red more brilliant. I do not, under the circumstances, however, consider it right to give these subspecific designation. There is a small area in Pahang where the Junglefowl are paler than any Indian birds, probably due to the infusion of some pale domestic strain. And again we find many accounts written by sportsmen which present such facts as those of Kelham in the "Ibis" of 1882: "Whether or not the Malay species, Temminck's *G. bankiva*, is really distinct from the Indian, it is hard to say; but if it is distinct, both kinds are certainly found in the Malay countries; for while stationed in Perak I shot, out of the same tract of jungle, unmistakable specimens of *G. ferrugineus*, with the rich golden hackles and white ear-patches, also birds of far darker, in one case almost black, plumage. But the wild Junglefowl interbreed so much with domestic roosters from the villages, that I cannot help thinking these dark-coloured birds to be the results of such intercourse, particularly as many of them, though very unlike the typical *G. ferrugineus*, are not like one another, varying much in the intensity of their colouring."

Weight, 1 lb. 12 ozs. to 2 lbs. 5 ozs.

Length, 630 to 700 mm.; culmen from nostril, 16; wing, 235; tail, 350; tarsus, 77; middle toe and claw, 55. Spurs averaging 33 mm., sharp, slender and much curved.

VARIATION AND MOULT

The hen-coloured game cocks are, of course, congenitally so coloured, but it is not unusual, as in other true pheasants, for the cock bird ontogenetically to assume the plumage of the hen. This is due to some injury to the sexual organs, and is one of the most inexplicable phenomena known to science. Its solution will mark a decided step in problems of evolution, and perhaps in the origin of life. Recent experiments by Morgan have indicated that the sexual organs of the hen-coloured Sebright bantams contain luteal cells which are usually characteristic only of ovarian tissue. This, together with the well-established acquisition of the cock's plumage in sterile hens, shows that these cells exercise a very important suppressive effect on the secondary sexual characters of the male bird.

Perhaps the most interesting thing about the moult of Red Junglefowl is the partial eclipse plumage into which the cock enters immediately after the breeding season. The general facts are the same as those given under *Gallus sonnerati* (p. 245). The long, red and yellow hackles are shed, while the remainder of the worn plumage remains intact. They are at once replaced by short, dusky brown or black feathers, not like the hackles of the hen, but very similar both to the hackles of the juvenile plumage and to the normal feathers of the mid and lower mantles, which in the full-plumaged cock are concealed from view by the overlapping, long lanceolate hackles. This eclipse plumage has sometimes a gloss of purplish or purplish blue. The long central tail feathers are sometimes shed simultaneously with the hackles, more often they fall out a little later. In two or three months the regular annual moult begins and the eclipse hackles are shed with the rest of the plumage, and in the autumn the cock is seen in all his resplendent colours, ready for another year of virile life.

No good reason has been advanced to explain this curious partial moult. In ducks the cause for the assumption of the dull female garb during the period of helplessness, consequent upon the simultaneous shedding of the flight-feathers, is very apparent. But this time of the year presents no unusual dangers to the Junglefowl, nor is the bird less able to care for itself than at other seasons. For the present we must be content to state the mere fact that these birds expend a considerable extra outlay of vitality in growing a localized patch of feathers, which lasts only a few weeks, and which in character is both atavistic and like the generalized feathers of the upper back. The time of assumption of this generalized neck plumage varies with the locality. From the terai south of Darjeeling I have a bird in full moult, shot on the twentieth of May, but this is unusually early even for the northern range. In the Malay States, August seems the usual period. Sportsmen who shoot birds in this condition usually consider them as abnormal, perhaps hemaphrodite individuals.

I believe that in birds of strictly wild blood and pedigree, this eclipse moult is regular, but in several cocks which I have shot, and in many more which I have trapped, I have noticed a great irregularity and even asymmetry in this moult, due, I am convinced, to the infusion of the blood of native village birds.

Juvenile Plumage.—In this phase the neck and rump-hackles are short and broader, with considerable variation, due to the earlier or later moult of the individual bird. The colours of these feathers are brighter and more distinct, the dark centres being larger, and the edges yellow, rather than orange. The flight feathers and their coverts are dark cinnamon, mottled and finely vermiculated with black.

Adult Female.—The variation in the plumage of the hen is, within narrower limits, correspondingly as great as in the cock, and, of course, attributable to the same causes.

The crown of the head is rusty red, shading into orange on the neck and pale yellow on the mantle, all the feathers with a wide black stripe down the centre. On the mantle this stripe is strongly glossed with green. Remainder of the upper plumage, beginning rather abruptly behind the mantle feathers, pale reddish or buffy brown, finely mottled and vermiculated with black, with a conspicuous, narrow, yellowish-white line down the shaft. Flight feathers brownish-black, the primaries very narrowly edged with buff. The visible portion of the secondaries (four-fifths of the outer web) vermiculated with pale reddish-brown. Tertiaries evenly vermiculated, with distinct metallic green sheen on the darker portions. Tail-feathers with rufous brown mottling, confined to the edges of the feathers, and considerable green gloss. Comb sometimes a minute fleshy knob; again a low, inconspicuous notched ridge. Wattles absent, and ear-lappets greatly reduced. Face and upper neck chestnut. Lower neck and breast light red, shading posteriorly, and on the sides, into pale buffy-brown, each feather with a pale shaft. The feathers have more or less dark mottling, especially those of the sides, where it takes the form of irregular, concentric bands. The breast and mid-belly is usually monochrome. Under tail-coverts blackish-brown, with slight brownish mottling.

The bill of the hen is usually paler than that of the cock; but otherwise the colours of the horny and fleshy parts are the same in both sexes.

Weight, 1 lb. 2 ozs. to 1 lb. 10 ozs.

Length, 420 to 460 mm.; culmen from nostril, 15; wing, 185; tail, 153; tarsus, 60; middle toe and claw, 50. Spurs absent.

CHICK IN DOWN.—Head fawn-coloured or yellowish buff; a wide maroon or chocolate coronal patch, pointed in front and narrowly bordered with black. A dark brown line extends through the eye, and back over the ear-coverts. The dark crown is continued down the neck and over the back, but is split on the sides of the lower back and rump by two wide creamy-buff lines, these also outlined in black. Under-parts creamy white, the breast sometimes deep buffy. Bill, yellow; legs and feet, yellowish green.

HYBRIDS

Gallus pseudhermaphroditus of Blyth was based upon an abnormal domestic specimen, said to be a male. The bird had the comb, wattles, spurs and tail of a cock, with a hen-coloured body plumage.

"*Gallus stramineicollis*, type Sharpe. Sulu Islands." Thus is labelled the type in the British Museum. It is a very large hybrid or domestic variety, with a small rose comb; bare face, chin, throat and lower neck; hackles, mantle, neck, lower back and rump, straw colour with narrow green shaft-stripe. Feet and legs very thick and heavy. The spurs are abortive. Culmen from comb, 18 mm.; wing, 230; tail, 410; tarsus, 96; middle toe and claw, 70.

SYNONYMY

Phasianus gallus Linn. S. N., XII. 1766, p. 270; Raffl. Trans. Linn. Soc., XIII. 1822, p. 319 [Sumatra].
Grande Caille de la Chine Sonn. Voy. Ind. Orient., II. 1782, p. 171.
Hackled Partridge Latham, Gen. Syn., II. 1783, p. 766, pl. 66; id. Gen. Hist., VIII. 1823, p. 307, pl. 129.
Tetrao ferrugineus Gmelin, S. N., I. 1788, pt. II., p. 761.

Perdix ferruginea Latham, Ind. Orn. II. 1790, p. 651.

Coturnix spadicea Bonnat, Tabl. Encycl. Méth., I. 1791, p. 218.

Gallus bankiva Temminck, Pig. et Gall., II. 1813, p. 87; III. 1815, p. 654; Steph. in Shaw's Gen. Zool., XI. 1819, p. 198; Horsf., Tr. Linn. Soc., XIII. 1822, p. 185 [Java]; Vieillot, Tabl. Encycl. Méth., I. 1823, p. 364; Griff., ed. Cuv., III. 1829, p. 20; Guérin, Icon. Règ. Anim., Ois. 1829–38, p. 26, pl. 42, figs. 2, 2a; J. E. Gray, Ill. Ind. Zool, I. 1830–32, pl. 43, fig. 3; Lesson, Traité d'Orn. 1831, p. 491; Schinz, Nat. Abbild. Vög. 1833, p. 342, pl. 94; Jard., Nat. Lib., Orn. IV. 1834, p. 175, pl.; Hodgson, in Gray's Zool. Misc. 1844, p. 85; Gray, List of Birds, Pt. III., Gall. 1844, p. 27; id. Gen. B., III. 1845, p. 499; id. Cat. Hodgs. ed. I. 1846, p. 125; Schinz, Nat. Vög. 1853, p. 145, pl. 69; Adams, Proc. Zool. Soc. 1858, p. 498 [Simla, S. Cashmere]; Saint-Hilaire, Bull. Soc. d'Acclim. 1859, p. 13 (Origin in History); Wallace, Proc. Zool. Soc. 1863, p. 486 [Lombock, Timor]; Sclater, List of Phas. 1863, p. 10; Sclater, Proc. Zool. Soc. 1863, p. 122; Blyth, Ibis, 1867, p. 156; Sclater, Proc. Zool. Soc. 1869, p. 628 [breeding in London Zoo]; Melliss, Ibis, 1870, p. 103 [domestic, St. Helena]; Wald. Tr. Zool. Soc., VIII., Pt. II. 1872, p. 86 [Celebes]; Hartlaub and Finsch, Proc. Zool. Soc. 1872, pp. 89, 103 [Pelew Is.]; Garrod, Proc. Zool. Soc. 1873, pp. 627, 640 [thigh muscles]; Garrod, Proc. Zool. Soc. 1875, p. 341 [plantor tendons]; Walden, Trans. Zool. Soc., IX. 1877, p. 223 [Luzon, Guimaras]; Tweeddale, Proc. Zool. Soc. 1878, p. 953 [Zamboanga]; Tweeddale, Proc. Zool. Soc. 1879, p. 73 [Basilan]; Meyer, Ibis, 1879, pp. 138, 146 [Menado and Limbotto, Northern Celebes; Posso, Central Celebes; Togian Is. habits]; Garrod, Proc. Zool. Soc. 1879, pp. 377–378 [trachea]; Sharpe, Trans. Linn. Soc., N. S. Zool., I. 1879, p. 348 [Panay, Philippines]; Gadow, Proc. Zool. Soc. 1882, pp. 318–319 [tarso-metatarsus muscle]; Kelham, Ibis, 1882, p. 1 [Perak]; Guillemard, Proc. Zool. Soc. 1885, pp. 248, 250, 272 [Sulu; habits]; Sundevall, Ibis, 1886, p. 455 [No. of arm-remiges]; Blas., Ibis, 1888, p. 374 [Palawan]; Shufeldt, Journ. Comp. Med. and Surg., Oct. 1888, p. 1 [anatomy and osteology]; Blas., Ornis. 1888, p. 317; Everett, List of Birds, Borneo, 1889, p. 199 [Balabac, Palawan]; Sharpe, Ibis, 1890, p. 57 [Palawan]; Whitehead, Ibis, 1890, pp. 40, 57 [Palawan]; Hartlaub, Abh. nat. Ver. Bremen, XII. 1893, p. 324 [Hainan]; Sharpe, Ibis, 1894, pp. 241, 257 [Sulu and Bongao Is. Sulu Arch.]; Everett, Ibis, 1895, p. 32 [Balâbac Is.]; Hartert, Novitates Zoologicae, V. 1898, pp. 61, 69 [Marianne Is.]; Finn, Jour. As. Soc. Bengal, N. S., LXXI. 1902, p. 85 [hen-feathered cock]; Goodchild, Bird Notes, IV. 1905, p. 66 [compared with Black-red Game]; Lawrie, Ibis, 1909, p. 192 [Increased fertility of domestic fowl]; Robinson and Kloss, Ibis, 1910, p. 672 [Trang]; Stubbs and Rome, Zoologist (4), XVI. 1912, p. 1 [prehistoric origin of fowl].

Gallus ferrugineus Blyth, Ann. Mag. N. H., XX. 1847, p. 387, I. 1848, p. 455; id. Cat. Mus. As. Soc., 1849, p. 242; Adams, Proc. Zool. Soc., 1859, p. 185 [S. Cashmere]; Irby, Ibis, 1861, p. 234 [the Terai of Oudh and Kumaon]; Jerdon, Birds of India, III. 1863, p. 536; Gray, List Gallinae Brit. Mus., 1867, p. 37; Blyth, Ibis, 1867, p. 154 [general remarks]; Beavan, Ibis, 1868, p. 381 [Darjeeling, Sikhim and Bhootan terai, Umballa; valley of the Salween and in Tenasserim, Maunbhoom]; Brooks, Ibis, 1869, p. 60 [Naini Tal, Almorah]; Bulger, Ibis, 1869, p. 170 [Leeboug, Sikhim]; Swinhoe, Ibis, 1870, p. 357 [Hainan]; Gray, Hand-list of Birds, II. 1870, p. 261; Swinhoe, Proc. Zool. Soc., 1871, p. 399; Elliot, Mon. Phas., II. 1872, pl. 32; Hume, N. and E. Indian Birds, 1873, p. 528; Ball, Stray Feathers, II. 1874, p. 426 [Chota Nagpur]; Hume, Stray Feathers, II. 1874, p. 482 [Pahpoon, Tenasserim, Amherst]; Blyth and Walden, Cat. Mammals and Birds, Burma, 1875, p. 149 [Tonghoo]; Hume, Stray Feathers, III. 1875, p. 171 [Upper Pegu]; Armstrong, Stray Feathers, IV. 1876, p. 338 [Irrawaddy Delta, China Bakeer]; Finsch, Proc. Zool. Soc., 1877, p. 780 [Ponapé]; Hume and Inglis, Stray Feathers, V. 1877, p. 44 [North-eastern Cachar]; Oates, Stray Feathers, V. 1877, p. 164; Wardl.-Ramsay, Ibis, 1877, p. 468 [Karen-nee, Burma, Nest]; David and Oustalet, Ois. Chine, 1877, p. 420 [Cochin China, Hainan]; Marshall, B. Nest India, 1877, p. 59; Hume and Marshall, Game-birds of India, I. 1878, p. 217, pl.; Anderson, B. W. Yunnan, 1878, p. 669 [E. of Kachin Hills, Upper Burma]; Hume and Davison, Stray Feathers, VI. 1878, pp. 442, 521 [throughout Tenasserim]; Ball, Stray Feathers, VII. 1878, p. 225 [from the Ganges to the Godaveri]; Hume, Stray Feathers, VIII. 1879, p. 68 [Malacca, Wellesley Province]; Scully, Stray Feathers, VIII. 1879, pp. 348, 367 [Nepal]; Salvad. Ann. Mus. Civ. Gen., XIV. 1879, p. 251 [Sumatra]; Anderson, Zool. Results, Yunnan, 1879, p. 669 [Bhamo]; Bingham, Stray Feathers, IX. 1880, p. 195 [Thoungyeen Valley, Tenasserim]; Fasson, Stray Feathers, IX. 1880, p. 205 [Chittagong]; Finsch, Ibis, 1881, p. 114 [Kushai and Ponapé Is., Caroline Arch.]; Müll., Jour. f. Orn., 1882, p. 432 [Salanga Is.]; Kelham, Ibis, 1882, pp. 1–2 [Perak, W. Malay Pen. habits]; Nicholson, Ibis, 1882, p. 65 [Gounong Trang and Kitta Djama, S.E. Sumatra]; Oates, Stray Feathers, X. 1882, p. 236 [Pegu]; id. Birds British Burmah, II. 1883, p. 322 [Siam, general account]; Nicholson, Ibis, 1883, p. 255 [Tandjong Djete, near Lake Ranau, 1700 ft. Central Sumatra]; Marshall, Ibis, 1884, p. 423 [Chamba]; Büttikofer, Notes Leyden Museum IX. 1887, p. 78 [Padang, W. Sumatra]; Taylor, Stray Feathers, X. 1887, p. 531 [Orissa]; Hume, Stray Feathers XI. 1888, p. 304 [Assam, Sylhet, Cachar, Manipur and British Burmah]; Hartert, Jour. f. Orn. 1889, pp. 379, 434; Tegetmeier, Ibis, 1890, pp. 304–327 [domestic breeds]; Oates, ed. Hume's Nests and Eggs, III. 1890, p. 417 [nesting habits]; Hartert, Jour. f. Orn., 1891, p. 301 (Mindoro); Laurie, Jour. Bombay Nat. Hist. Soc., VI. 1891, pp. 93, 98; Elliot, Auk, IX. 1892, p. 164 [hybridism and reversion]; Styan, Ibis, 1893, p. 435 [Hainan]; Blanford, Jour. Bombay Nat. Hist. Soc., IX. 1894, pp. 186, 188; Clarke, Ibis, 1895, p. 479 [Is. of Negros]; Hartlaub, Abh. nat. Ver. Bremen, XIV. 1898, p. 371 [Hainan]; Blanford, Fauna Brit. India, Birds, IV. 1898, p. 75 [General account]; Baker, Jour. Bombay Nat. Hist. Soc., XII. 1899, p. 487 [North Cachar]; Inglis, Jour. Bombay Nat. Hist. Soc., XII. 1899, p. 676 [Hylakandy Dist., Cachar]; Clarke, Ibis, 1900, p. 360 [melanistic specimen from Negros]; Rippon, Ibis, 1901, p. 556 [Southern Shan States, up to 3500 feet]; Nisbett, Jour. Bombay Nat. Hist.

Soc., XIII. 1901, p. 525 [colour of legs of domestic birds]; Hartert, Novitates Zoologicae, IX. 1902, p. 218 [Sumatra]; Meyer, Notes Leyden Museum, XXIV. 1904, p. 235 [South-east Celebes]; Hartert, Novitates Zoologicae, XI. 1904, p. 174 [Wetter Is. N. of Timor]; Macdonald, Jour. Bombay Nat. Hist. Soc., XVII. 1906, p 496 [Myingyau Dist. Burma]; Baker, Jour. Bombay Nat. Hist. Soc., XVII. 1907, p. 764 [Singapore]; Ward, Jour. Bombay Nat. Hist. Soc., XVII. 1907, p. 944 [Kashmir and Jammu]; Baker, Jour. Bombay Nat. Hist. Soc., XVII. 1907, p. 971 [Khasia Hills]; Macgrath, Jour. Bombay Nat. Hist. Soc., XVIII. 1908, p. 298 [Thandiani, Hazara Dist.]; Harington, Jour. Bombay Nat. Hist. Soc., XIX. 1909, p. 309 [Bhamo Dist.]; Harington, Jour. Bombay Nat. Hist. Soc., XIX. 1909, p. 365 [Rangoon Dist.]; Hartert, Novitates Zoologicae, XVII. 1910, p. 191 [Hainan]; Stubbs and Rome, Zoologist (4), XVI. 1912, p. 1 [prehistoric origin of fowl].

Gallus domesticus Tegetmeier, Proc. Zool. Soc., 1861, p. 102 [cock assuming hen plumage]; Lubbock, Ibis, 1862, p. 180 [possible bone found in Swiss lake-dwellings]; Sundevall, Ibis, 1886, pp. 435, 439, 441 [arm muscles]; p. 455 [No. of arm-remiges]; Müller, Der Zoologischer Garten, XXXIV. 1893, p. 146 [cosmopolitan distribution]; Gurney, Ibis, 1899, p. 39 [extreme age]; Rothschild, Bull. Brit. Orn. Club, XIV. 1904, p. 58 [hybridism].

Gallus giganteus Tegetmeier, Ibis, 1890, p. 308 [domestic Malay fowl].

Gallus gallus Grant, Cat. Birds Brit. Mus., XXII. 1893, p. 344; Bourns and Worcester, Minn. Acad. Nat. Sci. Acc. Papers, I. 1894, p. 29 [Philippines]; Oates, Jour. Bombay Nat. Hist. Soc., X. 1895, p. 112 [Ruby Mines, Burma]; Grant, Ibis, 1895, p. 471 [North Luzon]; Hartert, Novitates Zoologicae, III. 1896, p. 164 [Bulekomba, South Celebes]; Hartert, Novitates Zoologicae, III. 1896, pp. 564, 598 [Lombok]; Grant, Hand-book Game-birds, II. 1897, p. 48 [General account]; Hartert, Novitates Zoologicae, V. 1898, p. 124 [Timor]; Sharpe, Hand-list of Birds, I. 1899, p. 39; Nehrkorn, Katalog der Eiersammlung, 1899, p. 194; Whitehead, Ibis, 1899, p. 493 [Philippines, from Fuga Is. to Basilan]; Grant, Ibis, 1900, p. 606 [Wei-yüan, South Yunnan]; Bonhote, Proc. Zool. Soc., 1901, p. 78 [Khota Bharu, Kelantan; Kwala Selama, Perak]; Oates, Cat. Birds' Eggs Brit. Mus., I. 1901, p. 59; Ghigi, Mon. Zool. Ital., XIV. 1903, p. 319 [Generic character]; Finn, Avic. Mag. N. S., III. 1905, p. 102 [Red replaced by yellow and white]; Grant, Ibis, 1906, p. 504 [Mt. Apo, S.E. Mindanao, 8000 feet]; Robinson Jour. Fed. Malay States Museums, I. 1906, pp. 125, 129 [Malay Peninsula south of Kra]; Robinson, Jour. Fed. Malay States Museums, II. 1907, p. 67; Robinson, Jour. Fed. Malay States Museums, III. 1908, p. 55 [Pahang River]; van Oort, Notes Leyden Museum, XXXII. 1910, p. 110 [Western Java]; Stubbs and Rome, Zoologist (4), XVI. 1912, p. 1 [prehistoric origin of fowl]; Peters, Jour. Amer. Oriental Soc., XXXIII. 1913, p. 363 [history of distribution]; Beebe, Zoologica, I. 1914, p. 271; Morgan, Carnegie Insti. of Wash., 1919, Pub. No. 285.

Gallus pseudhermaphroditus Finn, Jour. As. Soc. Bengal, N. S., LXXI. 1902, p. 85 [hen-feathered cock].

Gallus bankiva bankiva Baker, Jour. Bombay Nat. Hist. Soc., XXV. 1917, p. 18 [desc. habits].

Gallus bankiva ferrugineus Baker, Jour. Bombay Nat. Hist. Soc., XXV. 1917, p. 3 [desc. habits].

Gallus ferrugineus ferrugineus Robinson and Kloss, Rec. Indian Mus., XIX. p. 14.

Gallus ferrugineus murghi Robinson and Kloss, Rec. Indian Mus., XIX. p. 15.

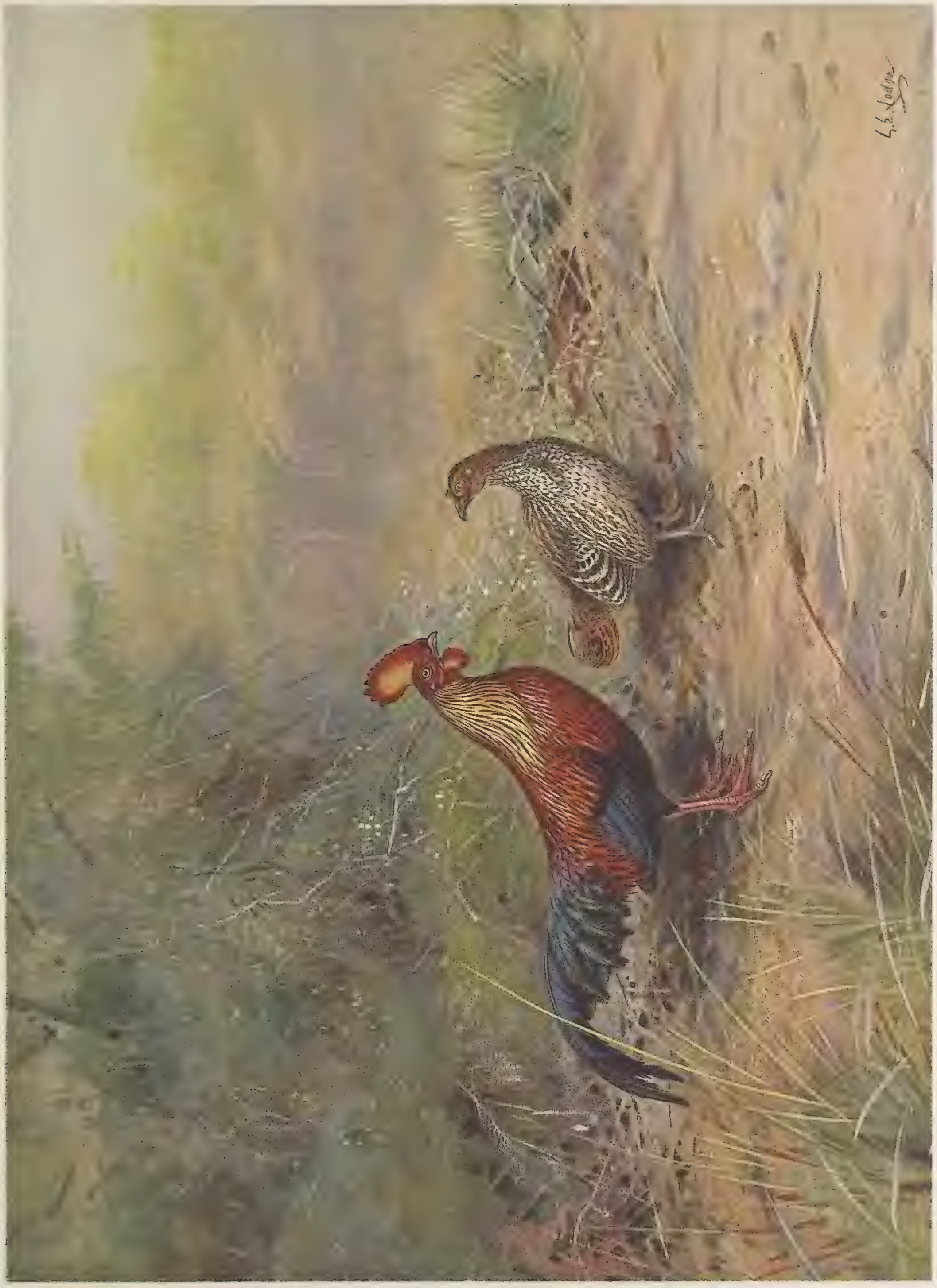
Gallus ferrugineus bankiva Robinson and Kloss, Rec. Indian Mus., XIX p. 15.

CEYLON JUNGLEFOWL

Gallus lafayetti Lesson

In the dusk of early dawn the Junglefowl begin to leave their roosts and make their way through the thorn thickets of south Ceylon to open glades. Here they send forth their loud crow, *chuck-George-Joyce!* Here they battle with each other, armed with sharp spurs, and here they scratch vigorously for worms and grubs. Sometimes a dozen birds can be heard crowing in various directions, but after sunrise they cease, and with the coming of heat the birds seek shelter under the dense foliage.

PLATE XLI.



CEYLON JUNGLEFOWL.

CEYLON JUNGLEFOWL

Gallus lafayetti Lesson

NAMES.—Specific: *lafayetti.* English: Ceylon Junglefowl. French: Coq Lafayette. Native: Wali-kukulá.

BRIEF DESCRIPTION.—Male: Hackles of neck and mantle and all but the largest wing-coverts pale straw to deep golden yellow, with a black or chestnut central stripe; back and rump orange-red, with much of the visible portion glossy violet; secondaries purplish, and tail-coverts and tail greenish-blue; greater coverts partly blue, partly chestnut; a violet patch on the lower neck; remainder of under parts bright orange-red; with the chestnut stripe becoming dominant on the belly, and black on the lower belly and flanks; comb red, with a central yellow patch; face, throat and wattles red; iris yellow, legs and feet pink or yellow. Female: Crown brown, nape rufous; mantle, back and wing-coverts brown or greyish, vermiculated with black; secondaries with irregular bars of black, buffy-white and chestnut; tail chestnut, mottled with black; upper breast mottled black and brown, with white shaft-stripes, which become dominant on the lower breast, with black margins and cross band; iris yellow; legs and feet brownish-yellow.

RANGE.—The Island of Ceylon.

THE BIRD IN ITS HAUNTS

IT is two o'clock in the morning in the wilderness of South Ceylon, and darkness and silence claim the whole world. From the porch rafters of a native house my hammock sways gently, and I twist around and peer out between the meshes. For a very long time there is absolute silence. Then far off there comes a series of falsetto shrieks and wild, inarticulate cries, as a native urges his bullocks along the distant trail. Now and then the wheels give forth a whining creak, and again silence settles down. The Cinghalese driver dozes, the wheels are quiet, but still the path of the cart is marked through the distant darkness. As it jolts past the acacias, a line of slumbering bulbuls is roused to semi-consciousness and a minute of silvery song. After a phrase or two each bird sleeps again, and the sweet refrain is taken up by the next in line. Always, so insistently that our conscious hearing fails to record it, sounds the dull klonk, klonk, of the bullock bells, those wooden notes of warning to the leopards slinking hungrily along the opposite side of the thorn scrub.

The first sound of dawn comes from the little house-lizards, as they cease their night's hunting and retire to safe nooks and crannies. All join in a chorus of sweet, thin notes, an acceleration of tones as of a marble dropped and settling to rest upon a silver table. About six o'clock the first bulbul awakens, and soon afterwards the tailor birds add their vibrations—*seet-o! seet-o! seet-o!* Now with a rush comes the full matin orchestra, and from all directions sounds the daily medley of croaks, whistles, warbles and coos. The crows vocally monopolize a certain period of the dusk. A lazy *kwa, kwa,* near at hand; then a distant *kwa! kwao!* and every black fellow within hearing at once takes up the variation and bandies it back and forth. Before sunrise the first Junglefowl challenges *chuck! George-Joyce!* and is promptly answered, and by listening carefully and orienting the various crows and their directions, ten or twelve may be individually distinguished.

I clap my hands and receive no response. Again, and a sleepy "Yes, Sahib!" comes from the rear of the house. When I am dressed, the very lightest of a *chota hazri* is brought, and then I am ready. The Tamil tracker falls in ahead, and with an occasional flash from my electric light, we make our way slowly along a narrow, winding animal trail. There is little danger of getting off the trail, for the least touch of the surrounding vegetation reveals a myriad punishing thorns.

After we have gone a mile or more I send him off to a clump of trees near the water-pools to see if he can bag a peafowl, and I continue my way in the dim light of early dawn. With a snarl a civet cat leaps to one side from my path, "civeting" in his excitement until the whole air is poisoned with the pungent musk.

Junglefowl were now calling close at hand, and as the light increased I began to efface myself as much as possible. I crawled to the top of a low, rolling bit of turf, and surprised a second large cat rooting for grubs. The animal slunk away silently. In front lay an acre or two of jungle-locked glade, bounded with tall euphorbias and acacias, with a few grassy knolls and a scattering of cock-spur thorn-bushes. As the sun rose I watched quietly and listened to the booming of the distant breakers. A tremulous, vibrating thread of sound arose close at hand, and I soon traced this to a high-backed tortoise, gorgeously marked with a radiating pattern of gold. He clambered awkwardly into view, waddled onward a few steps, reared up his leathery head, and with swelling throat sent forth the penetrating trill. At the very moment, as if Esop's fables were to be re-enacted here in this Ceylonese wilderness, a great hare leaped from a thorn bush, cleared a segment of the glade in three bounds, and vanished on the opposite side. Patiently I waited for more wild creatures, watching a pair of bee-eaters flycatching from a high acacia. A snort came from behind, and twisting my head, I was just in time to see a pair of axis deer vanish among the bushes. Then I was thrilled by a short, broken crow. Now that I heard it so close at hand, no human words fitted it; there was no George Joyce nor any other human appellation in it, nor was it at all like the crow of a domestic chanticleer, but a true wilderness voice, the challenge of the Ceylon Junglefowl.

Soon a form emerged from the shadows, and regardless of leeches and ticks, I flattened myself on the turf and strained through my glasses. Until the bird reached the first knoll it looked like a dark kind of pheasant, its head and tail carried low, and watchful of everything on land and in the air.

I could distinguish every detail of feather, every glance of the eye. There was naught of the domestic fowl in that carriage. Then he rose to full height and gave his call. The tail was raised, the head lifted high, the wings a trifle free of the body; and then the low catch-syllable and the ringing double-note. The cock advanced to a newly erected turret city of termites, and after a careful survey of every point, began vigorously scratching. For a full two minutes he made no attempt to feed, but with strong efforts jerked the earth backward with his strong claws, working devastation in the insect metropolis. Then he began picking, picking rapidly, glancing up every few seconds. He uttered a low *chack, chack*, in the tone with which, in fowl language, a hen is summoned. But before any Junglehen could answer, I unintentionally put an end to further observation. At full tension for many minutes, as I had been, I must have jumped a foot as a sudden *sw-e-e-e-e-ep* of wings roared in my very face—sudden and sharp as rifle shots. Close overhead, so that I was fanned by the disturbed air, a half-hundred golden plovers dashed like flying bullets. I have seldom been so momentarily alarmed. Frightened at the plovers or at my sudden motion, a Junglehen ran out from a bush at my right, cleared another bush without a movement of her wings, and melted into the dark shadows of the underbush. A glance at the cock showed a fleeing figure, running with remarkable speed for the nearest shelter.

Only the pair of green bee-eaters remained undisturbed, perched side by side on an isolated thorn twig; first one, then the other, hurtling upward, somersaulting after an insect, and dropping back to its mate.

GENERAL DISTRIBUTION

The Ceylon Junglefowl is confined to the island of that name—the oval pendant to the peninsula of India, measuring roughly one hundred and fifty by two hundred and fifty miles. It may be said to be generally distributed over the island, being more or less scattered through the dry jungly districts of the low country, and diffused throughout the hills of the Southern and Central Provinces. It is rather rare in the damper, more humid jungles of the maritime portions of the Western Province where Colombo is situated, and the south-western district, and is not common even in the forests of the interior. It is occasionally brought into Colombo and Galle by natives, but very seldom indeed into the former town. In the jungles of the Hewagam and Kayigam Korales its note is seldom or never heard, but further inland, in the Three and Four Korales, in Saffragam, and in the Pasdum Korale, one may often listen to its well-known cry. Likewise in the hilly jungles of the south-western district it is not met with near the sea; it is found about Oodogamma, and further up at the base of the ranges it becomes more plentiful. On the eastern slopes of the Morowak Korale, where a drier climate prevails, it finds a more congenial home, and along the Wellaway river, and from that eastward it is numerous. In the maritime portion of the south-east it abounds, delighting in the dense *Euphorbia* scrubs along the sea-coast. From this section of the country round the east coast to the north of the island it is very numerous, and inhabits all the northern forests, extending down the west side as far south as the Kurunegala district. In the hills it is resident, and breeds commonly up to about five thousand feet. On the Nuwara-Elliya plateau and up on the Horton Plains it is sometimes abundant during the north-east monsoon, coming up from lower down on the hills, and probably, to some extent, from the low country, to feed on the berries of the *nilloo*. It is probable that some may remain throughout the year in these uplands.

GENERAL ACCOUNT

The home range of the Ceylon Junglefowl varies greatly. It is undoubtedly strictly resident throughout the year in most of the dry maritime districts, but in the low hills and the jungles which fringe the slopes of the higher mountains of the interior it may show a marked seasonal migration. This is induced, not of course on account of change of temperature, but owing to the fruiting of certain food plants localized in well-defined districts, as I have already mentioned in the case of the *nilloo* berry. Aside from this there is little or no seasonal shifting, and although when the breeding season is past the birds are not nearly as concerned in keeping to their own particular beat, yet they do not appear to wander far. Four birds—two pairs—have been known to inhabit a circumscribed area of semi-desert scrub for a year and a half, breeding some two hundred yards apart, and almost never leaving this zone, which was bounded by two small streams. The young appeared to leave when full grown, and to settle elsewhere.

While I have stalked and watched Ceylon Junglefowl in the forests of the hills, I became most intimate with the bird in the semi-arid scrub of the south-east coastal lands. Here the vegetation is eucalyptus, acacias, and mesquite, with introduced cacti now forming one of the dominant floral features. The region as a whole is park-like, the thorn bushes and trees forming glades, sometimes dry and sandy, or again with little pools of water, and a thick carpeting of coarse grass. Into these open spaces the Junglefowl come to feed and exercise, leaving the denser coverts, in which they roost and to which they retire during the heat of mid-day.

In such a region, well up on the south-east coast, I found them very abundant in March. As I have said, it was possible to hear as many as a dozen birds calling, as one listened in the early morning, and during a walk of several miles in any direction their numbers did not seem to decrease. As one approached any given bird it would take alarm and cease crowing, and not infrequently I would catch a momentary glimpse of it as it dashed away, but a little way farther on, the voice of another bird would come into range, then others to right and left, and standing quietly one could count as many individuals as from the first point of listening.

I have never seen more than five birds together at one time, and of these, three were birds of the year, very evidently the brood of the remaining pair. From all that I have heard I believe these Junglefowl to be rather unsocial, except that several hens with their broods seem to flock together at times, the association being, however, somewhat loose except during the early life of the chicks.

The voice of the Ceylon Junglefowl is very characteristic, and not to be confused with the notes of any other bird in the island. When softened and modified by distance, the crow has a reasonably close resemblance to the syllables George Joyce, but when heard at close quarters the quality which hints of an insistent summons to this particular gentleman disappears, and a third distinct note becomes audible. The syllables and the tempo which close attention suggests, is as follows: *tsek*, ——, ——, *craw*, *croi!* The dashes represent fifths equal in time to the duration of each of the three notes. The whole utterance is snapped off short at the end and the accent falls upon the final syllable. There is little variation, and while I have been able to recognize each one of three or four out of the dozen which I could hear from my hammock each morning, it was only by such means as a very slight difference in accent or a slurring over of the middle tone. When suspicious, but not certain of danger, the cock utters the *tsek* alone. When alarm begins to be felt this changes to *clock*, *clock*. This note, too, is uttered when they hear any unusual noise as they are about to go to roost. A bird in captivity, which when approached is so timid that it rushes nervously about looking for some way of escape, usually at the same time utters this sound. The call of the cock to the hen is a low *chack*, *chack*, sometimes followed by a muffled tremolo of content. The cry of utter despair when the bird is suddenly flushed by dog or man, and takes to its wings in extremity of terror, is the usual loud gallinaceous cackle—

HOME OF THE CEYLON JUNGLEFOWL

Along the coast of Ceylon, where the eucalyptus, acacias and mesquite abound, these Junglefowl are abundant. The region is park-like, the thorn-bushes and trees alternating with glades or larger open plains, dry and sandy, or with pools and grass. Here they must ever be on the watch for leopards and civet cats, and at night they sleep in dense foliage on lofty limbs, well out from the trunk, so that an enemy approaching along the branch would at once be detected.

HOME OF THE CEYLON JUNGLEFOWL.

a series of harsh, shrill cries which convey their meaning to every creature within earshot. The challenge is accompanied, especially in the early morning, by a clapping together of the wings, and this appears to me to stand for a much more serious challenge than when the crow alone is uttered. I shall speak of this in greater detail under courtship and fighting.

These Junglefowl are extremely adverse to flying, and invariably try to escape on foot. I once saw a hen rise and partly fly, partly scale a distance of seventy-five yards before settling again into the scrub—the longest flight of which I have record. More fortunate observers say that they are strong on the wing, but all agree that they are flushed with difficulty. There seems to be no racial weakness of wing power, only the flat country which they prefer offers no incentive to exercise of this function. I have already spoken of their swiftness of foot. Their gait when unalarmed is, as in the other Junglefowl, dignified and alert. The tail is usually held quite low, except during challenge, courtship, and approach to battle, when it is raised as high as in any domestic cock.

DAILY ROUND OF LIFE

The food is varied, consisting usually of insects, wild seeds and grain, while whenever possible the birds will enter cultivated fields and by scratching do considerable damage to the newly-planted grain. The following list shows the contents of the crops of eight birds from South Ceylon, shot in March :—

1. Male. Nine large reddish berries with purple pulp ; several scarab beetles.
2. Male. A few green seed-pods ; 5 grass seeds ; 23 termites.
3. Male. One hundred and fifty green seed-pods ; 7 small mollusks of three species ; several hundred termite workers.
4. Male. One large tick.
5. Male. Many grass seeds still on panicles ; 1 termite ; 2 small mollusks.
6. Male. One large tick ; many grass seeds ; several scarab beetles.
7. Female. Twenty-five seed panicles of grass ; 1 small beetle.
8. Female. In the gizzard were 6 small, smooth, reddish stones, about 6 mm. in diameter, and a mass of black ants. The crop contained several hundred termite workers ; 1 brown and 2 black beetles ; 1 grasshopper ; 1 small wood roach ; several brown wood lice and centipedes ; a small snail ; a small hemipterid insect, many green seed-pods, and several petals of flowers.

The big ticks in the crops of Numbers 4 and 6 were alive and distended with blood, which they were apparently drawing from the lining wall of the crop. Termites take first place in the animal diet of Junglefowl, as in almost all tropical gallinaceous birds. It is a general belief that the young cannot be reared except on these insects, and in the birds which I was able to examine, it formed fully four-fifths of the food of the chicks.

I have already mentioned the love which Junglefowl have for the berries of the *nilloo* or cone-head plants, a species of *Strobilanthes*. Whenever this fruits among the undergrowth of the hill forests it tempts the birds from far and near, and they flock thither, coming even from the lowlands at the foot of the hills. This maturing of the seed in quantity takes place at very irregular occasions, sometimes it is said, at intervals of four to six years. One observer writes me that the *nilloo* shrub seeds only once in eleven years, after which it dies down. But this happens in the various districts in different years, hence the possibility of the seed being found ripe at much shorter intervals of time. Whenever this takes place, there is a widespread migration of the birds. They begin to ascend in December, January, and February, and disappear from the hill jungles about June.

A very general idea obtains in Ceylon that this fruit has the effect of stupefying the birds. A probable explanation is the excessive fattening effect of the *nilloo*, the birds, after feeding for some time, becoming veritable feathered balls of obesity. This, in many cases, would result in the effect described of the birds becoming sluggish and inert. It is true that the Junglefowl in the Horton Plains and about Nuwara Elliya do become affected, and are sometimes so fat or intoxicated, as the case may be, that they may be knocked down with a stick. One writer tells of several cock Junglefowl, apparently in perfect health, skulking under a bush at one's approach and allowing themselves to be caught in the hand. The bronze-winged doves, which are as fond of the *nilloo* as are the Junglefowl, never show any similar symptoms. Botanists know of no narcotic properties of this plant, however, and it may be that the birds eat some noxious fungus or other vegetable growth in the woods where the *nilloo* thrives. The Singhalese also believe that the eating of these berries at this season causes blindness among the Junglefowl. "About that season of the year," says Bligh, "if village fowls be brought to the hills they rarely escape a serious eye disease, which rapidly spreads through a given district, and in many cases they become totally blind in two or three weeks. This is the disease which the Junglefowl evidently catch. A dog of mine caught a Junglecock with one eye lost, and apparently from this cause."

The feeding habits of the birds are the surest indications of their presence, when no vocal utterance gives us a hint of their proximity. This may be purely circumstantial, as their tracks and evidences of scratching along roads or about the nests of white ants, or it may be the actual noise of this latter habit. In the dryer north-eastern forests and the semi-arid coastal regions, the fallen leaves do not decay as soon as in the humid jungles, and among these, harbouring a multitude of insects and seeds, the birds scratch vigorously in the same manner as the domestic fowl. The crackling and rustling of the leaves may be heard at some distance, and forms a very easy way of locating the birds. This by no means, however, ensures an approach within sight, for after every effort which they make, the birds listen intently, and are able to detect the very slightest noise. Many times, after the most careful stalk, I have utterly failed to catch even a glimpse of the bird. Occasionally, aided by an intervening mound and shield of leaves, one is able to watch the author of the noise, as, first with one foot, then the other, he sends leaves and *débris* flying.

This feeding begins in the early morning and continues until the heat begins to be oppressive. The birds then retire to the shade of some dense-foliaged tree or undergrowth, and either dust themselves, or doze, or strive to rid themselves of ticks and other parasites. This latter is a very important operation, as I shall have occasion later on to show.

The jungle and the coastal semi-desert regions swarm with hostile creatures, eager for prey such as the Junglefowl, but most of these are nocturnal. So before dusk has settled down the birds go to roost. They seem to choose a perch as high as possible, but always within the foliage itself, never upon an exposed limb at the top of the tree, and never close to the main trunk. The first precaution may be to guard against owls or the buffeting of the elements, the second, which is common to many birds, is undoubtedly for the purpose of being warned of the approach of any arboreal carnivore by the vibrating of the branch along which this approach must be made. In the dry coastal zone, where there are few high trees, the birds may be found only eight or ten feet above the ground in some acacia. But such a tree is always well isolated, in two instances to my knowledge standing alone in a glade, and thus fairly well protected against chance ascent by small carnivores.

In very wet weather the birds retire to trees, usually perching on the lower branches, waiting for the downpour to be over, but this is only a temporary return to roost, and any tree convenient to the feeding-ground is acceptable. The birds are extremely attached to the chosen roosting-place, and the regular roost is resorted to night after night, as is proved both by the abundance of sign and by the similarity of location as indicated by the early morning challenge. I found where one Junglefowl—a cock—spent night after night, and one mid-day I went to the tree and with as little noise and disturbance as possible sawed off and carried away the limb on which the bird was accustomed to roost, the sign locating this beyond doubt. The bird spent at least the following two nights on the nearest adjoining branch, after which I did not visit the place.

These wild fowl are usually found roosting singly, and when a pair or rarely four birds are associated, they perch on different branches or even adjoining trees. Once I found where such a quartette, probably two birds of the year with their parents, roosted on three trees growing close together. Fresh sign each morning showed that all four perches were occupied.

I have never observed any close association between the Ceylon Junglefowl and such birds as babblers, as is so common with other related species. All that I have seen have been alone, feeding or dusting themselves or on the lookout for danger, without any commensal or other relations with creatures of their environment. Exception may be made as regards domestic cattle, as the birds are sometimes seen feeding among a herd of these animals, doubtless benefiting by the insects which are disturbed as the big herbivores walk slowly along. They come out occasionally and feed with domestic fowls, although there is no such widespread intimacy as exists between the Red Junglefowl and the native poultry.

During the *nilloo* harvest, doves in large numbers are found feeding in close company with the Junglefowl, coming up-country until the whole jungle resounds with their cooing, but there is no actual competition in this case, as there is always a great surplus of food, and the association is in no way of mutual benefit (unlike the company of the babblers in other species) and results only from the unusual abundance and localization of food.

A captive cock Junglefowl made great friends with a Ceylon green parrot which was kept in the same run, and for months the two birds were inseparable. They fed together from the same dish, and much of the time the parrot sat contentedly upon the back of the cock, while at night they roosted side by side.

Enemies they have in plenty: large hawks and snakes, civet cats, all the small carnivores, and especially the mongoose. I have more than once encountered one of these latter animals stalking, as was I, a Junglefowl busy with its scratching. A reliable observer told me that once when lying in wait for deer he had seen a mongoose kill a hen Junglefowl and then make a systematic search for all her brood, four or five in number, of about two weeks' old chicks.

The hearing and the sight of these birds is amazingly acute. They will become suspicious at the least unusual rustle of an approaching footstep, while leaves and twigs may be falling in all directions and the wind making sudden rustlings and noises, to which they pay not the slightest attention. While the wild fowl in early morning come occasionally out into the roads and trails, or venture into grassy glades, yet it is always with an eye to cover. I have approached a crowing bird without attempting to conceal the sound of my footsteps and had it retreat slowly before me for several hundred feet, crowing from time to time as it went. In such a case one need never expect even the slightest glimpse of the bird, as it cunningly keeps under cover or dodges behind some intervening mound or grassy hillock. Of their preference for escape by fleetness of foot rather than by flight I have already spoken.

Junglefowl learn by experience to distinguish between degrees of danger. In a place where one could be sure of finding a half-dozen birds along a mile or two of jungle road in early morning, if I walked on foot the birds would dive into cover as soon as ever they caught sight of me, even when still a hundred yards away. But going over the same route in a bullock cart, and sitting under the cover alongside of the driver, the birds would reluctantly leave off their feeding and walk into the undergrowth only when we had approached within thirty or forty yards. They had evidently had occasion to fear neither the slow-moving carts nor the bullocks nor drivers.

In examining the specimens of Junglefowl which I shot day after day there came to my notice evidence of a factor in the lives of these birds of which we know but little. This was the mass of ticks which covered much of the combs of the birds. Parasites such as these probably always cause great discomfort, and doubtless, in many cases, bring death to a larger number of wild creatures than we realize. It is only by the close examination of specimens as soon as shot that we can learn anything definite concerning such phenomena as this, which may be of the utmost importance in limiting distribution, both local and general, and in affecting the vitality of the individuals. In affected cocks, the posterior and inferior borders of the comb were usually hidden by a mass of these parasites. In one bird I took the trouble to count the ticks on one side, and found two hundred and sixty-three, of all sizes and ages. When the ticks were removed by a wash of formaline, this part of the comb was seen to be raw, and in one case a secondary bacterial infection seemed to have set in.

HOME LIFE

The breeding season of this species has the tropical character of elastic limits, and eggs seem to be laid during almost every month in the year. I doubt if the explanation of two broods serves to account for this. A more reasonable interpretation might be the destroying of many nests by enemies and the consequent delay in the nesting. February to May seems to be the more usual period, but eggs in November and, on the other hand, in September are far from unknown. In the Batticaloa district it is said that eggs are found every month except in November, December and January. In the province of Noa, April, May and June are given as the most favoured months; in the northern parts of the island nests are found from February to August more often than at other times.

The Ceylon Junglefowl are very pugnacious. The clapping of the wings and the crowing are the preliminaries to battle, although much of this demonstration may be considered in the nature of bluff or of warning. One correspondent, Mr. Thomas, writes me that he considers the clapping as answering the purpose of a long stretch immediately after awakening, and to support this theory, makes the comment that it is seldom or never heard except before the first crow or challenge uttered in the early morning. Referring to a Junglefowl cock which he kept for some time in captivity and from which he bred a number of hybrid birds, he notes that if unexcited the cock would never clap his wings after the first call. On hearing another cock, however, he would do so once or twice, "probably in the nature of a stretch to feel if he was in fighting trim." I must take exception to this view, owing to the facility with which cocks may be called up by imitating the clapping of the wings, even when an attempted imitation of the crow is not added. Indeed, by use of the latter challenge alone, it is a much more difficult matter to entice the challenging cock within shooting distance. I shall give more in regard to this aspect later.

It is true that the clapping is usually confined to the first few crows. Whether this had its origin in the desire to stretch the wings in preparation for a flight to the ground from the elevated roost, we shall probably never know. To-day, at least, it is an important and significant part both of the audible challenge and defiance, and actually more potent than the crow itself to precipitate an encounter.

The cocks inhabiting the same general region, if mated, undoubtedly have a more or less definite territory over which they hold sway, and into which the advance of a strange cock is considered an intrusion to be disputed with all their powers of offence, and if necessary with their life. Cocks settled on adjacent beats or preserves do not advance to the attack at one another's early morning challenge, whether of clapping, crowing, or both together. Each, however, reacts at the very first sound, and a few seconds after the first bird awakens and challenges, every cock within hearing has thrown off his slumber and returns the defiance with all the force of his lusty lungs. A roving, unmated cock is detected at once, and he must either make his way silently across country, or be distinctly looking for trouble if he challenge anywhere in the vicinity of a settled cock.

The first one or several calls are given from the roost itself. The bird then usually descends to a low branch, and for a variable period of time devotes itself to crowing. In this situation the observations of several writers agree perfectly with my own. The bird walks or struts back and forth along the branch, lowering and raising his head. When crowing, the head and neck are stretched far upward. Where the bird has no room for lateral movement it nervously raises first one, then the other foot, during the intervals of crowing. It seems usually to have some particular rival within hearing, for whose challenge it listens. As soon as it has finished a crow, it steps or moves about, but the instant the clap or the crow of the other bird is heard, it freezes into an attitude of concentrated attention, and gives voice again the moment the rival has ceased.

When their mate has a brood of chicks, I am told they fly down at once to the ground, where they crow from time to time as they search for food. When thus engaged even continued and exact imitation of the wing clapping will not entice them away.

Many days of observation in the dry coastal belt of country show that the Junglefowl begins to crow at the very first hint of dawn, about 5.15 a.m., and at 5.30, just *before* sunrise, their chorus is at its height. Half an hour later it has begun to diminish, both as to number of birds and frequency of utterance. The birds are now apparently feeding, but there is no actual cessation until about nine o'clock.

Toward evening a second challenge period occurs, never, however, as enthusiastic or persistent as that in the morning, and this is stopped by dusk, when the birds reach their roosting-places. I have heard what was probably a final crow, sounding forced and sleepy, with but little of defiance in its drawled utterance. On cloudy days, hardly an hour passes without a crow from one direction or another, and now and then an emotional outbreak will occur and spread from cock to cock until the chorus is almost as great as at daybreak. This is of rare occurrence, however, and lasts but a short time, when silence again ensues.

I have several times found scattered feathers and the entangled tracks of the feet of Junglefowl, indicating that a battle had recently taken place. Where the ground is soft such evidence is quite conclusive if no tracks other than those of the birds themselves are visible. But I have never found a disabled bird nor blood on the feathers. My most direct evidence was the condition of some of the cock birds which I shot, their damaged hackles, half-healed scars on the breast and sides, and torn combs showing that they must have been through some severe contests. The length and sharpness of the spurs of this species make it probable that such encounters must frequently end fatally. There are several accounts of fights between wild Junglefowl and native cocks, the former always coming out victorious.

Ceylon Junglefowl are both monogamous and polygamous, with no apparent preponderance one way or the other. I have known of two hens undoubtedly mated to a single cock, and again I have found three different pairs of birds, each pair feeding and roosting in such isolation that there was little doubt that they were mated. Three is the largest number of hens reported to me as constantly seen with a single cock during the breeding season. Captive Junglefowl are always attentive to hens, feeding them, and paying much court to them. The few times that they have mated in captivity it has always been with but one out of a number of domestic hens. When, however, several hybrid hens have been introduced, the wild cock has mated with them without delay.

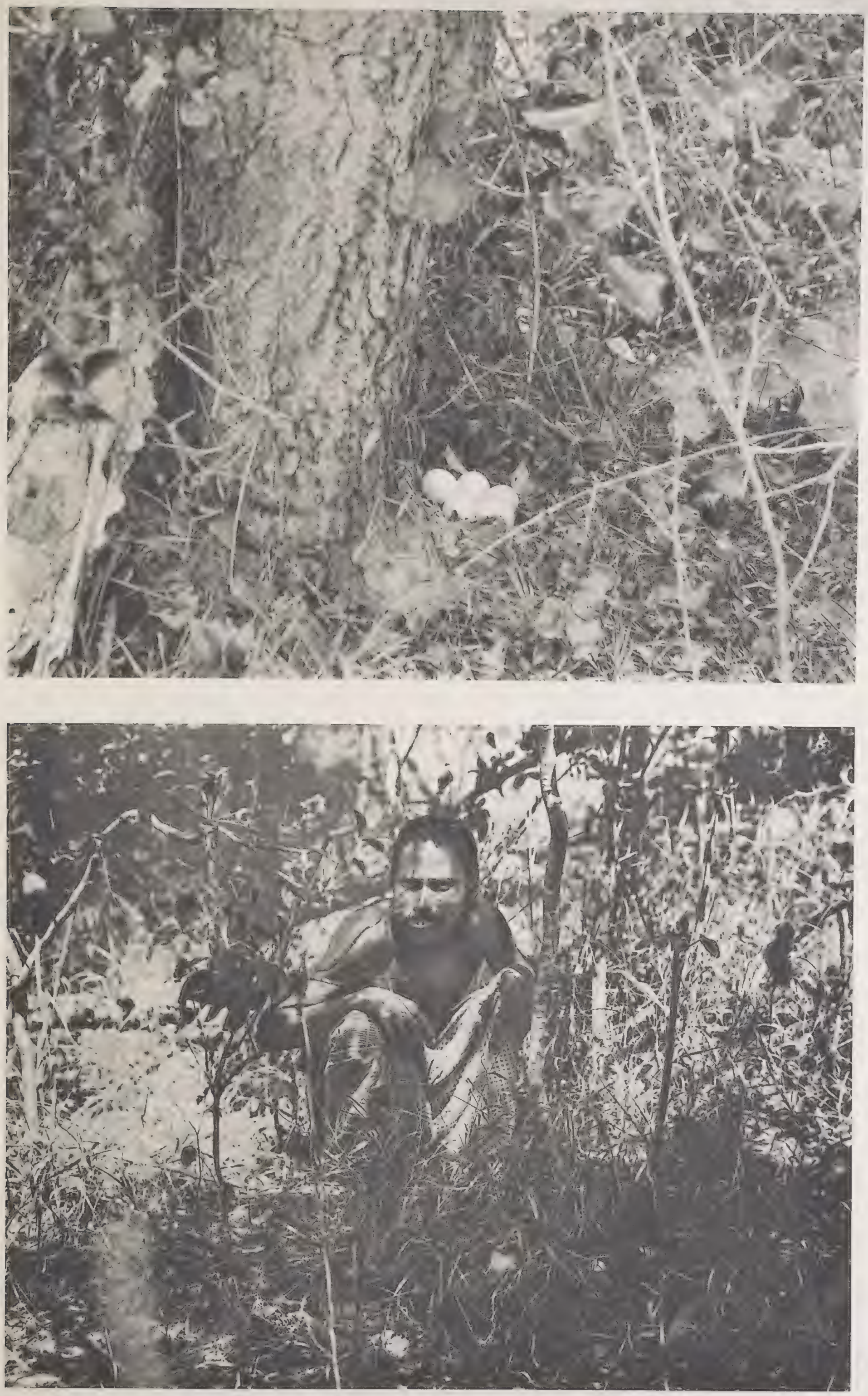
The sites of nests are various. I found two nests, one close to the trunk of a small tree, protected by overhanging vines, and the other far under the drooping twigs of a cock-spur thorn-bush near the edge of a glade. Other situations on the ground may be in a clump of grass or bamboo, in the shelter of the turrets of a white ants' nest when surrounded by grass, or in the hollowed base of a rotten stump of a tree. Mr. Thomas has found a nest hidden under an old log, and also

NEST AND EGGS OF THE CEYLON JUNGLEFOWL

The nest is usually placed on the ground at the foot of a tree, and only the leaves and grass already present are used as lining. The hen sits very closely, and deserts her eggs only when danger is actually upon her. Her colours harmonize perfectly with the hues of the dry vegetation, but the eggs, when exposed, are conspicuous. Five or six is the usual number, and they are as small as the eggs of bantams, and sometimes slightly spotted.

A native Vedda, one of the aboriginal Cinghalese, was skilful in tracking down the birds and their nests, and found one of my first nests, which the chicks had just left.

PHOTOGRAVURE PLATE 34



NEST AND EGGS OF THE CEYLON JUNGLEFOWL

one in the summit of a decayed stump, seven feet from the ground. Even more surprising are several nests recorded by Parker in the tops of trees, and in deserted squirrel nests. One was in a well-built nest in a sapling, at thirty feet elevation, doubtless the deserted home of a crow or hawk, which had been appropriated by the jungle hen. How the young chicks which emerged from the three eggs reached the ground in safety is impossible to conceive. There is hardly any doubt but that their little necks were broken; a tragic penalty imposed by the foolishness of the mother in choosing such a site. The dry leaves with which the more usual ground sites are carpeted form a splendid background for the protection of the sitting hen, the colours of whose plumage harmonize perfectly with the various browns and russets. She sits very closely and deserts her eggs only when danger is quite upon her. There is no attempt at actual nest-building, and it is seldom that any lining, other than that already present, is added. The hollow in which the eggs rest is sometimes a natural one, sometimes scratched out by the bird, in which case it bears traces of the excavation, and is usually devoid of any lining, the eggs resting upon the bare earth or sand.

The number of eggs varies from two to eight. There seems to be no definite variation as to number in nests of low- or of up-country birds, although there seems to be a slight percentage of increase as we ascend. Four seems to be the most usual number. I have found five in one nest, all with a slight peculiarity of pigmentation which confirmed their being laid by a single bird. In the *nilloo* season on Horton Plains eight to ten have been found in one nest, but two hens unquestionably united in such cases. We can readily imagine that the unusual altitude and general environment, as well as the change in food and the close association of such large numbers of Junglefowl, would doubtless affect, at least to a slight extent, the regularity of the birds' habits. The suggestion that the fat condition of the birds at this period may have conduced to an increased fertility is extremely improbable, as we know that excess of fat in domestic birds often brings about a cessation of laying altogether.

The eggs themselves vary widely. They are smooth and glossy ovals, and may be either of a uniformly unspotted white, or buff, or rich *café au lait* colour. Or these ground colours may be present in eggs uniformly spotted with brownish red or burnt umber. Usually this marking is absent or very sparse at the small end, while the rest of the shell shows an even, minute speckling, or this reddish pigment may increase toward the obtuse end until it is all but confluent at that point. The eggs vary from 33 to 36 mm. in breadth, and from 45 to 48 mm. in length, averaging 35 by 47 mm.

Two or three seems to be the usual number of young hatched, or at least brought to maturity. Seven is the largest brood recorded as following one hen. The wings of the chicks develop very rapidly, but for at least two weeks they are dependent altogether on their marvellous powers of concealment. When alarmed, the hen utters a loud, sharp *clock!* and makes her way slowly away from the source of danger. I have never seen her, nor have I any record of her pretending to be injured, but the rapidity of her exit from the scene of concealment of her brood is adapted to the exigency of the danger. She may half fly, half run if a dog fly at her, or she may run slowly with many backward glances and occasional stops before she disappears in the underbrush. After the first note of warning she is silent, and upon the instant of utterance the chicks vanish, either squatting in their tracks or taking a short run to the shelter of a mass of dead leaves or a fallen branch. Here they remain until the hen returns. I once sat quietly for an hour, close to where the chicks had disappeared, without hearing or seeing a sign from any of them. The hen was in the neighbourhood, but did not show herself. In some way she knew of my continued presence, but only twice, during the entire period, did she repeat her warning *clock!* When the young are three-quarters grown, there comes a time when they do not seek to escape by squatting or hiding, while yet their independence is not developed strongly enough to send them off at the first alarm. More than one observer has noted that when the hen of such a brood has been shot, the young would continue to run back and forth in the vicinity, calling loudly, and loath to leave their parent.

The food of the chicks consists chiefly of termites, as well as minute insects scratched from among the leaves.

In unfrequented districts, where the natives do not trap or molest the birds, the hens with their broods show less fear of the approach of man, and even when the cocks are present, they may be approached within gunshot. The cock is always the first to leave, the hen and her brood following when one's steps have brought the birds a few yards nearer. During the months when the young Junglefowl remain with the parents, both of the latter are found together, although the cock never incubates or approaches the nest closely. He remains in the vicinity, however, and crows at intervals throughout the period of incubation. Several people told me the hen cackled or called when she either deposits an egg or leaves her nest to feed, but of this I have no direct confirmation, and place no reliance upon it. She goes to the cock, however, at such a time, and the two usually feed together, after which she returns to her eggs.

RELATION TO MAN

The Junglefowl seems to have entered quite deeply into the life of the Singhalese in past times, for both the wild bird, the domestic descendants of the Red Junglefowl and the peafowl are found as ornaments in graves and elsewhere. We find these represented in all periods, that of bronze work, about five hundred years ago; later, when brass became the general medium, during the eighteenth and nineteenth centuries, and in the comparatively modern and recent period of pottery. The old cocoanut-oil lamps, used in the temples during the bronze and brass periods, are more often than otherwise surmounted by figures of these birds.

To-day the Junglefowl seems to be holding its own in many parts of Ceylon, in spite of more or less trapping throughout the year. It adapts itself in a measure to deforestation, and is able to live in coffee plantations or in scrub of reasonable density in the absence of jungle. In the hill districts, if anywhere, the bird is becoming scarcer. A few instances have been brought to notice where these birds systematically injure newly-planted crops, so that they had to be shot or frightened

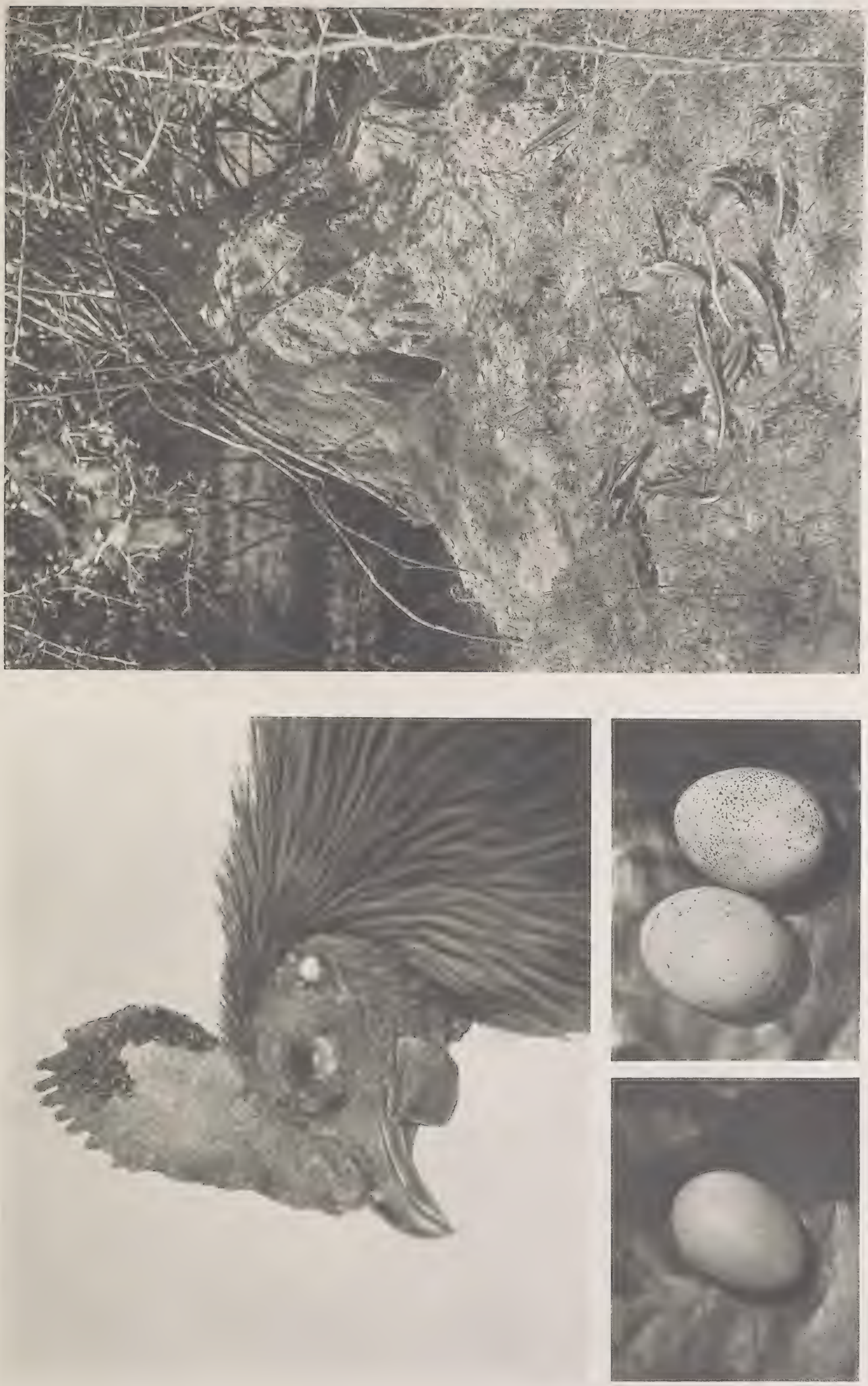
CEYLON JUNGLEFOWL

In the more arid places Junglefowl often suffer from the attacks of ticks, which attach themselves to their comb in large numbers, and although they will sometimes preen one another's plumage, they seem never to attempt to rid their companions of these pests.

The eggs vary from white to a rich cream colour. Usually they are unspotted, but occasionally eggs will be found which are thickly covered with dots and spots of brownish red.

In trampled places in the thorn-brush, feathers are sometimes found, showing where severe battles have taken place between rival cocks. But this photograph reveals a real tragedy. A cock Junglefowl had been feeding on the insects which it had scratched from a nest of termites, when a civet cat or similar enemy had pounced upon the bird, plucked out many of the larger wing feathers and carried it away.

PHOTOGRAVURE PLATE 35



TICKS ON COMB, EGGS, FEEDING PLACE AND FEATHERS OF CEYLON JUNGLEFOWL.

away, but as a whole these birds may be considered a negligible quantity in their power to injure man's cultivations.

The Junglefowl, from the variety of its food, has caused some sportsmen to be enthusiastic over the delicacy of its flesh, while others describe it as tough, tasteless, and scarcely edible. It seems, however, to be hardly worth shooting for the table when doves can be procured. At any rate, that was my experience in south Ceylon, and I have heard from many Europeans in various parts of the island that only the natives find them worth eating. This fact, together with the religious aversion of the Buddhists to taking life, are points in favour of the continued existence of the Junglefowl for many years to come. While their feathers are sometimes used in tying fishing flies, and occasionally exported for millinery purposes, these uses do not threaten their extinction.

In the recent game laws, the Junglefowl does not seem to be included in the term "game," which embraces four species of deer, besides "peafowl, grey partridge, painted partridge and Ceylon spur-fowl." We find them mentioned, however, in a clause which reads: "Shooting at night and netting game or Junglefowl, unless trespassing upon cultivated land, is prohibited under a penalty of one hundred rupees, or three months, or both." So we find the birds totally unprotected by law, and yet holding their own in most places.

The natives of Ceylon have many ways of trapping Junglefowl, both by snares and by spring-traps. The most effective method in use in the hill jungles is the construction of a miniature fence of small sticks, nine or ten inches high and fifteen or twenty yards long. Several gaps are left near the centre, six or eight inches wide. For several days food is scattered about on both sides of the fence and around the gaps. Then, when the birds become accustomed to feeding regularly hair nooses, attached by a catch to a bent spring, are placed over the gaps, and several birds are certain to be caught.

Another native method of trapping is by the use of a net, about six feet high and twenty yards long, which is stretched in a semicircle across a gully. When it is in position, a score or more Singhalese form a line and work down toward the gully through the jungle, noisily driving all the terrestrial birds and animals ahead of them. In this way many species of small mammals and birds, including Junglefowl, are entangled and captured.

The most widespread way of shooting Junglefowl, practised both by Europeans, Singhalese and Tamils, is to attract them by imitating the sound of the clapping of the wings which often precedes the vocal challenge. When the sportsman has made his way into a good position as close as possible to several crowing birds without having aroused their suspicions, he crouches low on the ground and begins to call. If a native, the hollow sound of the clapping wing, *wop! wop! wop! wop!* is made by striking the thigh with the hollowed hand. Europeans produce an imitation of equal excellence by making a pad of a pocket handkerchief, holding it in one hand, and striking it with the palm of the other, both hands being hollowed. It is only when the cock thinks its preserve is being encroached upon, or if a wandering, unmated bird be near, that it will heed the challenge. But when once aroused, its anger increases as it approaches, and it is apt to burst into sight without warning. Only a moment is permitted to the sportsman, as the keen sight of the bird takes in the situation at a glance, and like a flash it turns and vanishes beyond recall.

CAPTIVITY

Even in Ceylon, Junglefowl do not thrive well in captivity, and there are only a few instances of birds having been reared from the nest and kept for years in good health and feather. They must have plenty of cover as well as a chance to be in the sunlight as much as they choose, together with an abundance of insect food. If captured adult, the first is the critical week, as on the slightest provocation the birds dash themselves again and again against the top of their run. A domestic chicken (not a full-grown fowl) placed in the run with them is a most effectual help in calming the wild-caught birds and inducing them to eat. Low country and medium elevations offer the best climates for keeping these birds, as captive Junglefowl feel the cold over four thousand feet rather keenly, and besides, insect life is less abundant at the higher altitudes.

It is seldom that any details are available in connection with captive birds, newly caught in their native land, so the following notes[1] seem to me of particular interest in showing the unexpected psychological acceptance of captivity on the part of some of the wild Ceylon Junglefowl.

"During the experiments carried on by members of the Ceylon Poultry Club with the Ceylon Junglefowl, several interesting incidents occurred which are worth recording. The following notes record some of these incidents. They occurred mainly in the experimental run put up by Mr. Clement Johnson, who was the only experimenter who succeeded in producing hybrids, some thirty chicks in all, from a mating of a junglecock with a domestic hen.

"At one time he secured two jungle hens, which he placed in a large covered-in run with a jungle cock and two domestic hens. These hens tamed down wonderfully quickly, and were great friends with the cock. After a time one jungle hen developed gapes, so it was caught and set at liberty. Writing of this hen, Mr. Johnson says: 'The jungle hen that I released interests me greatly. Its one object is to get back into the pen. It walks round and round outside or perches on the top. Any sudden or unusual noise alarms it, and it flies or runs into cover. On the other hand, you can approach within a few yards' length of it, when it just calmly walks out of your path like a very tame domestic fowl, no hurry or flurry about it at all. It avoids fowls that cross its path. Since its release the jungle cock inside the run calls more or less all day long, and is undoubtedly distressed at seeing this hen at liberty outside his run. He gets frantic when she makes a run and disappears from view. I will give her a week or ten days' liberty, and then drive her back into the run again.'

"This hen, after haunting the scene of her captivity for many days, disappeared one night. It is presumed that she was destroyed by one of the jungle cats that patrol the neighbourhood.

"A little later the second jungle hen developed chicken-pox. Fearing that infection would spread, Mr. Johnson had this hen also caught and liberated, but she likewise refused to depart from the scene of her captivity. But as her removal was deemed necessary, she was caught and taken across a ravine and liberated in the jungle some quarter of a mile away. Next day, however, she turned up again, trying to get into the run. She was caught a second time and taken further afield and liberated. After this, as she did not return, it was thought she had gone for good. However, some days later she was back again. She was now quite cured of the chicken-pox, having evidently cured herself in the jungle, either by eating some herb or by living in surroundings natural to her. After this she continued to live in the garden outside of the run, and used to walk about with some of the young hybrids which Mr. Johnson had bred, roosting at night in the branches of a tree along with the hybrids. The fact of consorting with the wild hen rendered these hybrids a little less tame than usual. This hen eventually made a nest in the garden and laid three eggs and sat on them. As she was running with immature hybrid cockerels, and had always rejected their advances, these eggs were not expected to be fertile. They were, however, removed from the nest and set under a domestic hen, and, as expected, all proved infertile. There is little doubt that, if Mr. Johnson had not left for England at this period, this jungle hen would shortly have produced fertile eggs by running with the more matured hybrid cockerel in the garden, and he would have produced the unique cross of hybrid cock and jungle hen.

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[1] Thomas, "Spolia Zeylanica," VII, 1911, p. 159.

"When her own eggs were removed from the jungle hen's nest, they were replaced by three eggs laid by the domestic hen running with the jungle cock, and these she incubated. Just at the time of hatching one egg got broken in the nest; it was an addled one. This attracted thousands of ants to the nest, which not only drove off the sitting hen, but killed and partly devoured the two chicks just hatched from the other two eggs. It would have been a strange sight to have had a jungle hen strutting about the garden with some hybrid chicks.

"Jungle hens have never bred in captivity. Mr. Johnson's opinion is that this hen would never have bred with the hybrid cock or any other cock if it had been confined within wire-netting walls.

"On the other hand, the late Mr. Young of Udabagie had two jungle hens in captivity for considerably more than one year, and they were mating up with a domestic cock, and Mr. Young was very hopeful of producing hybrids from this mating, when his tragic death by lightning put a stop to the experiment.

"It was just at this period that Mr. Johnson left Ceylon for England. Before he left this jungle hen was enticed into the run and caught, and with the jungle cock was sent to Mr. G. C. Bliss at Atagalla. The cock did not take kindly to the close confinement necessary while his big run was being put up in the new locality, and began to sicken; when turned into the big run he did not recover, so he was let out and given his liberty. At night time, however, he returned to this run (in which the jungle hen had been also placed) and was allowed to go in. Next morning he was found dead. Thus, after a captivity of sixteen months, ended the life of a most interesting bird—the progenitor of all the thirty hybrids that were produced during the experiments. This jungle cock mated only with the one domestic hen, and would have nothing to do with any other hen, in fact he drove them all away. Even when his own particular hen had been removed for a month owing to illness, he still would have nothing to do with any other. After the death of this cock the jungle hen became excited and wild, so she was given her liberty, and flew away to be heard of no more. The history of this hen is surely unique. She had lived either in the experimental run or in the garden just outside it for eighteen months."

The Ceylon Junglefowl has bred at least once in the London Zoological Gardens, in the year 1874, but it is unusual for the hens even to lay in captivity, and this record is almost unique. Of eleven individuals which have been confined in those Gardens, one lived for three years, the average length of life of all being a year and a half.

DETAILED DESCRIPTION

Adult Male.—Ear-coverts greyish-white; feathers on the top of the head and occiput deep rufous orange; hackles on the back and sides of the neck, upper mantle and lesser wing-coverts straw yellow or golden orange, with a conspicuous black shaft-stripe. Posterior part of the mantle, scapulars, median wing-coverts and lateral feathers of the lower back and rump orange-red, this colour being confined to the wide, visible, disintegrated fringe, the remaining part of the feather being maroon or chestnut. On the central feathers of the lower back and rump the deep orange-red is confined to a narrow fringe, the rest of the visible part being richly iridescent violet, shading into bluish posteriorly. On the upper tail-coverts this in turn changes into a bluish-green gloss, which characterizes the central rectrices, and the outer web of the succeeding two or three pairs, the remainder of the tail being dull black. The primaries are dull brown; the secondaries and their greater coverts black, with considerable purplish-blue gloss. The inner coverts are sometimes margined on the outer web with dark chestnut.

A conspicuous patch of feathers at the edge of the bare throat rich, iridescent violet or purplish-blue; chest, breast and sides orange-red like the lower mantle and upper back, the central maroon streak less prominent; belly chestnut, mottled and tipped with black; flanks, thighs and under tail-coverts chiefly black, the latter glossed with greenish.

Bill horny brown, anterior half of lower mandible yellow; iris straw yellow; comb bright purplish red, with a large wing-shaped, central, yellow spot. This spot is very bright and arises abruptly just over the eye, but shades off at its margin into the colour of the comb. When the comb measures about 80 × 30 mm., the yellow spot will cover an approximate area of 50 × 25 mm. In some birds the yellow is so abundant that the general aspect is of a yellow comb with a red border.

Facial skin, throat and wattles usually clear bright red. Occasionally the wattles will show a central yellowish spot, and in these individuals the throat too is yellowish. Legs and feet pink in full-coloured birds, or in others mottled with white or yellowish, or wholly waxy yellow; claws dark brown; spurs black or yellowish at base; weight 2¼ to 2½ lbs.

Culmen from nostril, 16 mm.; length, 660 to 725; wing, 230; tail, 340; tarsus, 80; middle toe and claw, 60; spurs long and curved, 37 mm.

VARIATION AND MOULT

In Ceylon one hears a great deal about the difference in the species of Junglefowl which inhabits the hills and mountains of the interior, or of variations in birds from the several provinces. The following quotation from Price will show what I mean by this. "It may interest you to learn that there is, or was until lately, a white jungle fowl hen to be seen in company with other ordinary jungle fowl at a place on the Anuradhapura-Puttalam road, about fourteen miles from Anuradhapura. When I saw it first I mistook it for a paddy bird, and it would have escaped identification as a jungle fowl if it had not been in the company of another pair. I got quite close to it and saw that it was undoubtedly a jungle hen, almost pure white, except for a few grey feathers on the neck and head. Mr. Vigors, the Government Agent, saw the same bird shortly afterwards at the same place. At the time I saw this bird I was not aware that such a variation in colour was so uncommon, or I might have made an exception to my general principle of sparing curiosities. Both Mr. Vigors and I thought it would be better to leave it where it was, to see if it would have any effect on the colour of the other birds about that locality. Down in the south of Sabaragamuwa and in Humbantota there is an inclination for the birds to be brown, especially the hens, which are very dark, in many cases with black spots on tail and wings. The tendency in the open scrub country of the Northern Province and in Tamankaduwa, in the North-Central Province, is for the birds to be red in colour; the cocks, of course, always have a lot of red about them, but it is more brilliant and lighter up north, and exactly to the same extent is the hen light in colour. I suppose it is the same influence which makes the wandaroo monkey almost black down south, while he is almost white up north."

I lost no opportunity of obtaining direct and first-hand evidence of this, and came to the final conclusion that if any such distinction actually exists, only series of several hundred birds with exact data of age, locality and season could prove it. I was told that the voice of coastal birds differed from those of the interior, which I proved beyond doubt to be an error. The plumage of the low country birds was said to be lighter and paler, and the birds somewhat larger, with a greater development of comb and wattles. The series which I was able to collect in the coast districts of southern Ceylon ran the full gamut of these variations, and the same is true of the birds which I obtained from high levels. I believe that all altitudinal or regional variation is lost in the very considerable individual variation.

The regular annual moult takes place usually in September and October.

ADULT FEMALE.—Crown dark brown, nape rufescent, the feathers sometimes with distinct black margins. Neck and mantle dark orange or rufescent brown, sometimes with indistinct black mottling, or again, with the black arranged in two wide, irregular, concentric bands. These feathers are sometimes fringed with quite bright golden-brown. Remainder of upper parts and wing-coverts finely mottled reddish brown and black, usually with a hair-like, whitish shaft-streak. These streaks are always absent from the lower back and rump, which are of a deeper rufous tone. Primaries dark brown with a series of pale buff spots on the outer web; secondaries and their coverts black with mottled buff cross-bars on the outer webs, the black areas often with an irregular basal wedge of chestnut springing from the shaft. Inner web plain brownish-black or mottled with buff. The larger black areas are often glossed with purplish-blue.

Tail rich rufous, mottled with black. The black on the central feathers sometimes takes the form of two broad longitudinal bars on the inner web and a succession of spots on the outer web, lengthening basally into irregular transverse bars. These black areas, when well developed, are glossed with purplish-green. The remaining rectrices may be evenly mottled, or may show black spots or bars of similar character.

Face scantily clothed with pale brown; chin and throat with whitish feathers; upper breast mottled black and rufous-brown, with broad buff shaft-stripes. These increase in area and become white on the lower breast. The remaining under plumage is dominately white, with a fringe and a wide cross-bar of black, the latter margined basally with buff. Under tail-coverts like tail. Comb, wattles and spurs rudimentary.

Upper mandible brownish-black, yellowish toward the tip; under mandible chiefly yellow; iris lemon yellow; face, comb and wattles purplish-red; legs and feet pinkish to waxy or brownish yellow. Weight 1¼ to 1¾ lbs.

Bill from nostril 15 mm.; length, 400 to 450; wing, 190; tail, 125; tarsus, 65; middle toe and claw, 53 mm.

VARIATION

Hardly any two hens are alike in coloration, and besides this, a bird in well-worn plumage presents a very different appearance from one which has recently completed its moult. The rufous and buff in the plumage change by wear and abrasion to greyish white, this alteration being particularly noticeable in the wing-bars. These areas of lighter pigmentation seem to offer much less resistance to wear and tear, and at the end of the season the light bars in the wing will have lost almost all their barbules and appear quite white, while the intervening areas of black show but little destruction to the components of their portion of the vane. I have shot three females on successive days within an area of some few hundred yards, all birds which had recently bred, which exhibited in their plumage the extremes of abundance and absence of black patches in the tail feathers, and with mantle feathers of very different shades and patterns.

Chick in Down.—Triangular crown patch narrowly margined with black, chestnut, extending down the neck and spreading over the upper plumage. A wide black line begins in front of and above the eye and extends back as a superciliary across the ear-coverts and on until it joins the nuchal black. Remainder of the top of the head buff, becoming whiter on the face and pure white on the chin and throat. The dark upper down is bordered laterally on the back and rump by a black-margined pale buff stripe; breast tinged with reddish-brown; remaining under parts creamy white. Upper mandible black, with the tip and all of the lower mandible yellow. Legs and feet yellowish. Bill from nostril, 6 mm.; length, 90; wing, 50; tarsus, 22; middle toe and claw, 20 mm.

Juvenile Plumage.—This state of plumage of the young birds is singularly like that of the adult female, differing chiefly in the ventral white being less pure, more mixed with the browns, and the rufous tending rather to greyish or sandy.

The down of the head and neck persists, as usual, long after the entire body is clothed in contour plumage. The mantle is an indefinite mixture of sandy buff, reddish brown and black mottling, with the shaft areas of the lighter tint. The remainder of the dorsal plumage is much disintegrated, with terminal brownish mottling. The scapulars and many of the coverts are tipped with buffy white. The primaries are dark brown, with sandy or whitish mottling on the outer webs; the secondaries are heavily banded, as in the adult female, but with purer whites, differentiated from the chestnut bands which separate the buffy white from the black bands. Toward the tip of the inner secondaries and tertiaries, the black becomes restricted to round marginal ocelli on each web, and this ocellated appearance is even more pronounced on the larger wing-coverts, where the black eye-like spots are framed in buffy-white. There is an unusual amount of variation in this plumage, however, extremes being found both in lowland and upland birds, in those from the arid south of the island and the more humid north. For example, the tail-feathers in the juvenile plumage of either sex may be rich chestnut, evenly mottled and vermiculated with black, or each web may have a longitudinal black band down the centre, or again, there may be as many as six black cross bars, equalling the intervening chestnut spaces.

The chin and throat are pure white; the breast, like the mantle, with the pale buffy shaft-stripes much clearer and more conspicuous. The breast and belly are whitish, the brown and buff mottlings dying out into an indefinite brownish tinge. The bill, legs and feet are yellowish, the upper mandible sometimes quite dark.

First Annual Moult.—A series of birds taken when this moult is nearly or quite completed shows no two individuals alike. The females, having comparatively little change of colour and pattern to undergo, usually moult into quite fully adult dress, but the males range all the way from a richly chestnut bird mottled with black, to individuals with but little remaining traces of juvenile pigment. The barred secondaries are always lost, but the feathers are usually heavily mottled with brown and rufous; while the mantle shows all stages between rich chestnut, olive-yellow and the straw yellow of the adult. From the birds which I have seen, the upland birds seem to moult into cleaner, clearer colours, the lowland individuals usually retaining more of the immature, generalized patterns.

The succeeding moult takes the bird into the complete adult plumage.

HYBRIDISM

Several Englishmen in Ceylon, notably Messrs. Thomas and Johnson, have gone to great pains to gather accurate data concerning the reputed sterility of the hybrids between the Ceylon Junglefowl and domestic poultry. They hoped to bring proof that the former had played an actual part in the origin of our barnyard fowls. This, I think, is not necessary. The red junglefowl seems to supply all the requirements necessary as the direct ancestor of our domestic stock, and these hybridization experiments are of purely scientific rather than of atavistic interest.

The percentage of fertility of the hybrids when bred *inter se* has been exceedingly low. Only one egg in each lot laid has been fertile, and of all the eggs produced (about one hundred in the course of a year) only two chicks have been hatched, these living twelve and eighteen days respectively. The following summary gives us the general results of the Ceylon experiments :—

The experiments have shown that

1. The hybrids are not always sterile when bred *inter se.*
2. The hybrids are not sterile when bred back to the domestic parent (*i.e.* hybrid cock with domestic hen).
3. There is some indication that the hybrids may sometimes be fertile when mated back to the jungle parent (*i.e.* Junglecock and hybrid hen).
4. Jungle hens have never laid in captivity.

While, without much difficulty, it is possible then to obtain hybrids from a cross between the wild Ceylon Junglecock and a domestic hen, yet these hybrids bred together are, to all intents and purposes, sterile, while the hybrids of the wild red junglefowl are as fertile as either of the parents.

I believe that very rarely the wild Junglecock crosses voluntarily with the native poultry, and here and there hybrids resulting from such interbreeding are to be found in the native villages. But that this is a frequent or widespread occurrence seems to me an error based on groundless assertions of the natives. Many so-called hybrids were brought to me and proved to be nothing but domestic birds.

EARLY HISTORY

The first mention of this species in scientific literature seems to be in the year 1831, in Lesson's *Traité d'Ornithologie*, where he names the bird *Coq Lafayette*, "*qui*," as Des Murs says, "*indique suffisamment l'influence des préoccupations politiques du moment.*" Lesson has this to say of it: "*Gallus Lafayetii: Coq sauvage de Ceylan, Gal. de Paris. Deux petits barbillons à la mandibule inférieure; plumes de la collerette effilées, jaune d'or, avec une flamme brune au centre; le thorax recouvert de longues plumes étroites rouge doré, flammées de noir; bas-ventre noir; queue courte, brune; un demi-collier violet sous la peau nue du devant du cou. Habite Ceylan.* (*Leschenault*)."

About the same year, Gray, in the volume of illustrations which he gives from the collection of Major-General Hardwicke, figures (pl. 43, Fig. 2) the female. This he calls Lord Stanley's Hen, *Gallus stanleyi*, Gray, but gives no text of explanation. In 1849 Des Murs in his *Inconographie Ornithologique* gives an excellent plate of the cock. He says this bird had been donated to the Paris Museum in 1822 by Leschenault, who brought it from Ceylon, and through some curious mischance had passed unnoticed for nine years until discovered by Lesson. Des Murs, of course, did not recognize the hen in Gray's plate as the female of this Junglefowl, so he ends his account: "*Il est à regretter que l'on ne connaisse pas la femelle du G. Lafayetii.*"

The earliest account of the general habits—a good one, too—is that of Layard, in the Annals and Magazine of Natural History for 1854.

SYNONYMY

Gallus lafayetii Lesson, Traité d'Orn. 1831, p. 491; Gray, Gen. B. III. 1845, p. 499; id. List Gallinae Brit. Mus. 1867, p. 39.

Gallus stanleyi J. E. Gray, Ill. Ind. Zool. I. 1830–32, pl. 43, fig. 1; Blyth, Cat. Mus. As. Soc. 1849, p. 243; Layard, Ann. Mag. N. H. (2), XIV. 1854, p. 62; Sclater, List of Phas. 1863, p. 10; Blyth, Ibis, 1867, pp. 154, 307; Gray, Hand-list of Birds, II. 1870, p. 261; Holdsw., Proc. Zool. Soc. 1872, p. 468; Legge, Ibis, 1875, p. 400; Hume & Marshall, Game-birds India, I. 1878, pl.; Sclater, Animals in Gardens Zool. Soc. London, 1883, p. 488; Mitchell, Proc. Zool. Soc. 1911, p. 522 [viability in captivity].

Gallus lafayettii Des Murs, Icon. Orn. 1849, pl. 18; Elliot, Mon. Phas. II. 1872, pl. 33; Hume, N. & E. Ind. Birds, 1873, p. 530; Hume & Marshall, Game-birds India, I. 1878, p. 241, pl.; Hume, Stray Feathers, VII. 1878, p. 429; Legge, Birds Ceylon, III. 1880, p. 736, pl.; Oates, ed. Hume's Nests and Eggs, III. 1890, p. 422; Blanford, Fauna Brit. Ind. Birds, IV. 1898, p. 77; Thomas, Spolia Zeylonica, IV. 1907, p. 19 [hybridization]; Ryan, Spolia Zeylonica, V. 1907, p. 16 (Dimbula); Finn, Game-birds India, 1911, p. 19; Henry, Spolia Zeylonica, VII. 1912, p. 59 [Tamblegam; habits].

Gallus lafayetti Grant, Catalogue Game-birds Brit. Mus. XXII. 1893, p. 348; Butler, Jour. Bombay Nat. Hist. Soc. X. 1896, p. 311 (Tungala, Wva; habits); Grant, Hand-book Game-birds, II. 1897, p. 53; Oates, Game-birds India, I. 1898, p. 375; Lewis, Ibis, 1898, pp. 339, 550 [Sabaragamuwa Province]; Ghigi, Mon. Zool. Ital. XIV. 1903, p. 319 (generic characters); Storey, Hunting and Shooting in Ceylon, 1907, p. 69.

Gallus lafayettei Sharpe, Hand-list of Birds, I. 1899, p. 39; Oates, Cat. Eggs Brit. Mus. I. 1901, p. 60, and pl. VII. fig. 8.

Ceylon Junglefowl Thomas, Spolia Zeylonica, VII. 1911, p. 159 [notes on captivity].

GREY JUNGLEFOWL

Gallus sonnerati Temminck

NAMES.—Specific: *sonnerati*, after M. Sonnerat who first described the cock and hen. English: Grey or Sonnerat's Junglefowl. French: Coq Sonnerat. German: Sonnerat-huhn. Native: *Komri*, Mt. Abu; *Jungli Murghi* (Hindustani) Central India; *Ran-kobada* [male], *Ran-kobadi* [female] (Mahrati) Sahyadri Range; *Parda Komri* (Gondhi) Chanda District; *Kombadi*, Deccan; *Adanikode* (Telegu); *Katu-koli* (Tamil); *Koli*, *Kad-koli* (Canarese), Mysore.

BRIEF DESCRIPTION.—Male: Hackles on neck and mantle fringed with grey, with black centres along which are several yellow or whitish spots like sealing-wax; median and greater wing-coverts very similar; back, lesser coverts and under parts brown or black, with a greater or less amount of grey, forming a fringe and central stripe; rump and tail-coverts purplish, tail glossy green. Female: Upper mantle rusty, with broad, buffy-white shaft-stripe; upper parts brown, mottled with black, the light shaft-stripe disappearing posteriorly; under parts predominantly white, fringed and sparsely mottled with black.

RANGE.—Western, Central and Southern India.

GENERAL DISTRIBUTION

THIS Junglefowl is generally distributed in Southern India. Its northern boundary may roughly be defined thus: the valley of the Godâvari from its mouth on the eastern coast up to the northern tributary, the Indravati. After continuing some distance up the valley of this latter river, the northern line of distribution leads irregularly northwestward through Bhandara, Seoni and Pachmarhi to the westward-flowing Nerbudda. About one hundred and twenty-five miles from the Arabian Sea, the birds cross the river and extend in a narrow finger northwards through the Vindhya and the Mahikanta Mountains to Mt. Abu, and thence are found in few and fewer numbers some distance farther north among the Aravalli Hills, the northernmost record being about 26° N. Lat.

Southward its haunts are bounded only by the sea, the fifty miles of water between the mainland and Ceylon forming a barrier which divides two distinct species of Junglefowl. Like the other birds of its genus, the Grey Junglefowl is not a lover of flat, open, cultivated tracts. Hence within the limits of Southern India there are large areas from which the bird is wholly absent. In jungle, or in hilly, broken country they are very widely distributed, with centres of abundance in the larger ranges, such as the Western Ghats, the Sâtpuras, the Nilgiris, Puhneys, Shervaroys and Anamalais.

GENERAL ACCOUNT

The home range of the Grey Junglefowl seems to be rather limited, and in the few cases reported to me of an individual bird being observed for any length of time, the wanderings have been very circumscribed. Davidson writes: "They are very punctual in their appearance at particular feeding-grounds, and when one or more are

GREY JUNGLEFOWL

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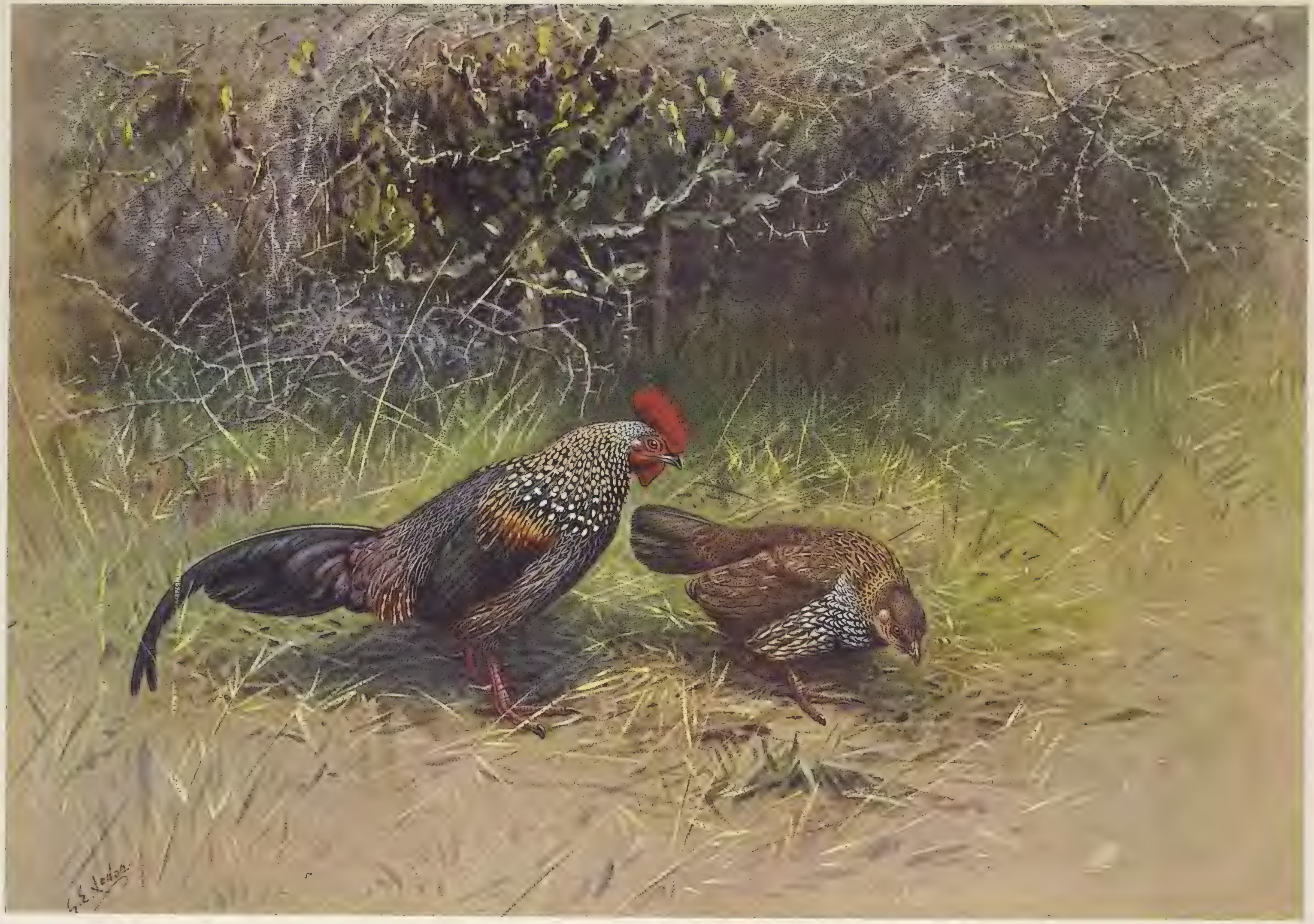
The Junglefowl of southern India range from the sea-shore to an altitude of five thousand feet. Mated pairs appear to remain together throughout the year. At the breeding season the birds retreat to distant parts of the jungle, but at other times they often feed openly in trails leading out of villages, especially where cattle are pastured. The spots on the hackles of the cock are like drops of sealing-wax, and unlike any character found in other Junglefowl.

PLATE XLII.



GREY JUNGLEFOWL.

met with in any particular spot, they are certain, if not disturbed in the interim, to be found again in the same place at about the same hour the next or any subsequent day on which they may be looked for. There was one particularly fine and remarkably shy and cunning old cock that frequented an open glade in the forest (above the Government Cinchona Plantations at Neddivuttum) in the *morning*, whereas in the *evening* he always came into the plantation and wandered about under the cinchona trees, and along the plantation roads. He never, to my knowledge—and I must have seen him fifty times at least—came into the plantation in the morning, or into the glade in the evening. There was no doubt as to this being the same bird that frequented the two places (nearly a quarter of a mile distant), for he was the largest, handsomest, and to judge from his spurs, the oldest cock I ever saw. 'I loved that cock as a brother I did,' and *at last* I circumvented and shot him." They are occasionally found among evergreen forests in the mountains, and near the edge of the plains I have surprised them among semi-arid vegetation, cacti and euphorbias. They are found in greater numbers in light deciduous jungles, but their favourite haunts are hillsides covered with bamboo jungle, whether small and thin in character or among thick, giant stems.

Where the jungle reaches the shore, these birds may be found within sound of the breakers at sea-level, and from here they range upward to four and five thousand feet. Indeed on Dodabetta Mountain, in the Nilgiri Hills, individuals have been seen at seven thousand feet elevation. In spite of this very considerable altitudinal range, there is no seasonal migration, owing to the tropical latitude, there being not sufficient extremes of temperature to induce any change of locality. There is, however, in many places a very marked seasonal wandering in search of food, or rather in search of some variety of food which becomes locally abundant at a certain period of the year. Thus we read that while usually the birds are evenly scattered over a given district, when a certain tract of bamboo comes into seed, the Junglefowl will collect in large numbers, again dispersing when the food is consumed. Hume quotes an authority who says: "I remember on one occasion when the undergrowth of the *Sholas* about Pykarra (which consists almost entirely of *Strobilanthes sp.*) seeded, the Junglefowl congregated there in the *greatest* numbers, I mean by hundreds, and were excessively numerous for more than a fortnight, when they gradually dispersed, owing, I believe, not so much to the seeds having all been eaten, as to what remained of them having sprouted and so become uneatable."

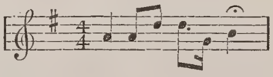
Where quiet jungle roads are found, frequented by cattle and mules, these birds will often be found in the early morning, and as many as fifteen have been seen within the space of a few miles. The Grey Junglefowl is decidedly not a gregarious bird, however, and I have never heard of a real flock or covey, except as above mentioned when numbers are associated temporarily for the purpose of enjoying some favourite article of food. When several are found together, it will be noticed that there are almost never more than two adults, presumably the parents of the remaining more or less immature birds. Generally they are found singly or in pairs. As with many birds, I believe that the pairs are associated throughout the year, although they may feed day after day by themselves. It may be that there is some sort of reassociation, however, during the hot weather and rains, for at such times the cocks seem to be solitary, while when one hen is flushed, several others are often to be found close by.

The voice of the Grey Junglefowl is very characteristic. The crow of the cock must either show great variation in different parts of its range, or, what is more probable, the ears of the people who have described it have been at fault, deceived by the call of other birds of the jungle, or by the differences caused by distance, certain notes being thus altogether inaudible, or much altered as to time and pitch. During the breeding season, especially when the weather is cloudy, the cock may call at intervals throughout the day, but as a rule in the cold weather its challenges are confined to early morning and toward sunset. The crowing seems to extend beyond the actual limits of breeding in any one locality, being heard sometimes from October or November until May, during the period of most perfect plumage. The utterance is not difficult to imitate, and with a very little practice the bird may be made to answer again and again. I have never, however, been able to draw the bird within sight or even very far in my direction, as is so easily done with other species.

Disregarding several published descriptions, which fall very wide of the mark, we find that one reliable author transcribes it as a broken, shrill *ăk-ă-ăk-khee!* uttered very deliberately and at intervals. This is certainly a very unusual type of crow, if it be correct.

A very careful observer writes me as follows: "The crow of the cock (preceded on the ground by a flapping of the wings as a rule, but not always) is *Kaaa, a-a-doodle-a*, the first note a scream, but not always uttered; in fact there seems to be no rule as to when it precedes the crow and when it does not. There follow two short, staccato notes, a double, rather lower note, well described by 'doodle,' which is the emphatic syllable of the crow; then another short *a*, followed, sometimes, by an indrawn note which is not heard except at close quarters. Perhaps in the crow as represented above, the final *a* would be better represented by *da*. The call is uttered, as a rule, from trees in the early morning, sometimes even at night, generally when there is moonlight, but occasionally even when there is pitch darkness, and is then, as far as I know, never preceded by a flapping of wings. The key of the voice is somewhat sharper and higher, more staccato than that of the common farmyard fowl. The flapping of the wings always precedes the vocal part of the challenge."

"The crow of the male," says Davidson, "is very peculiar, and might be syllabled, '*Kuck-kaya-kya-kuck*,' ending with a low, double syllable, like '*Kyukun, kyukun*,' repeated slowly and very softly, so that it cannot be heard except when one is very close to the bird." This is the best published transcription with which I am familiar. Sitting with note-book in hand within a comparatively short distance of a crowing bird, and then checking this with repeated observations of the challenge of this Junglefowl in captivity, I find the average crow to be as follows, except that perhaps an octave higher would be nearer the pitch:



The alarm call consists of three short notes in a high key, like *tuck-tuck-tuck* or *kuck-kuck-kuck*, the middle syllable, or rather word, for the notes are quite separate, emphasized and somewhat higher than the other two. This call means that the cock or hen (hers is very slightly different) sees something it does not like, or cannot quite make out. When put up by an enemy they go off with a loud, frightened *kakakakakak !* with the *a* as in the word "that." This outburst is often continued until they alight in a distant part of the jungle.

There is nothing of especial interest about the gait of these birds, which differs in no respect from that of other Junglefowl. The tail is carried low, except when the bird is courting, or approaching a rival. When it runs at full speed the tail fairly trails and the head is also lowered until in a straight line with the body. When listening for danger, the bird stands so erect that the line of its neck and back is almost vertical, the longer tail-feathers pressing against the ground. The flight is rapid and strong. When thoroughly alarmed by the sudden appearance of a sportsman, the birds will often run with head and tail held low, dodging about any convenient tufts of vegetation, until at some distance, when they rise with rapidly beating wings and fly for several hundred yards before seeking safety in some dense bit of jungle.

DAILY ROUND OF LIFE

Grey Junglefowl come into the open, as upon roads, or at the edge of fields, or in open patches in the jungle itself in early morning, retiring to cover as the heat increases. During mid-day they remain quietly on the ground or on low branches, seeking food rather casually, preening their plumage, or indulging in the luxury of dust baths. Toward evening they again resume activity, coming again into the open, or descending to some favourite stream to drink. In cloudy weather, however, they move about in the open throughout the day.

The food of the Grey Junglefowl is varied in character, consisting in general of various seeds and grain, small fruits and berries, with occasionally leaves and flower petals, while insects of almost any order, but especially termites, are acceptable. Sometimes their crops will be crammed with nothing but grass seeds, or again millet from the fields of the natives, or after land has been burnt over, they enjoy the tender, juicy shoots of the newly-sprouted grass.

They roost in trees, and when deer-hunting at daylight sportsmen have often flushed them from their perches. They usually select some bent bamboo stalk, or again frequent a clump of dense evergreens, perching high up and always in thick jungle. One correspondent writes me that they always perch singly, even although there may be several in the same tree or in neighbouring ones.

It is the impression of some observers that the Grey Junglefowl are less courageous than the red species. "They are so extremely wary," to quote Davidson, "where birds and animals of prey are concerned, and wander such short distances from the edges of cover, that I think very few of them fall victims to any enemy but man. There are plenty of the Bonelli eagles and some hawk-eagles too in the Nilgiris, but I do not think that these ever succeed in capturing Grey, as they do elsewhere red, Junglefowl; at any rate, I have never once seen the feathers of *sonnerati* strewed about, as I have those of *ferrugineus* in Burma." It is probable that this is an error, and I see no reason to think that they enjoy any greater immunity from attack than any other species of bird living under corresponding conditions. In fact the proclivity of red junglefowl to live in the vicinity of native villages, and their consequent familiarity with mankind, probably renders them immune to the attack of many wild creatures who fear to approach so closely to civilization, and also tends to make us more familiar with the pugnacity which is so very general a character of birds of this group. To the north at least, in Kanara, their enemies are numerous enough, including leopards, cats of several species and hawk-eagles. Pythons must prove a danger at times, and mongooses may be one of the most dreaded enemies. In Kanara the crested hawk-eagle kills large numbers.

Feeding in the same thickets or jungle with Grey Junglefowl, one often finds spurfowl, bustard-quail, and other small gallinaceous birds, none of which appear to be in any way actual competitors. On the other hand, we find, as among so many pheasants, a quite close association between Junglefowl and various species of babblers, which at times are found feeding and actually mingling with a family of half-grown Grey Junglefowl. The bond in this, as in all similar cases, is facility in obtaining food, the scratching of the fowls sending many insects flying and hopping, enabling the lesser birds to seize them before they can escape. In return, the babblers all unconsciously render full payment, by keeping a keen look-out for danger from their more elevated perches, and often spoil a long, careful stalk.

This Junglefowl needs little help, however, in the matter of detecting danger, for its eyes and ears are of the keenest, and it will even discover one when perched motionless in a tree. In such a position I have found it possible to watch many species of pheasants without attracting their attention or even arousing their suspicions, but the keen, suspicious nature of the Grey Junglefowl has always been more than equal to any ruse of mine.

I have myself noticed, and we find the fact recorded by several writers, that the cock is much more shy than his mate. This is in line with my observations upon other pheasants, where the more conspicuous the difference in colour between the sexes, the more pronounced is the amount of wariness and boldness respectively, displayed in the face of approaching possible enemies.

Where they have never been disturbed they are not especially wary, and will even take their time in leaving some attractive bit of food. Even in such a case, however, a good gun-shot distance marks the deadline at which they disappear into the nearest cover. When they have been disturbed or shot at for a few weeks, they become exceedingly shy and wary, and it requires the best woodcraft to catch even the most fleeting glimpse of them.

When not feeding they do not usually wander very far from cover, and a fraction of a second suffices for them to dash out of sight. Unless actually pursued, they do not go very far away. If the observer passes on and pretends to leave the spot, slipping behind a tree-trunk at the last moment, and waiting quietly, the birds will soon reappear close to the place where they vanished. If the danger seems real, and they think that they are being sought, they will continue to thread their way silently, deep into the heart of the jungle, often, after they have gone some distance, flying up and concealing themselves in the dense foliage of a tree.

HOME LIFE

There are records of these birds breeding from October to July. As for example: Nilgiris, March and April; Ootacamund, October, November, and December; Coonor, May and June; Satara, March and April; Mysore, November to July; Mt. Abu, March to mid-June; Kanara, October to April. In fact, there is one record from South Travancore of a nest and eggs found on August 20.

The courtship of the Grey differs in no essential particular from that of the red junglefowl. The approach, the beginning, and the climax, are all similar.

Despite some arguments to the contrary, they are fully as pugnacious and courageous as the red junglefowl, and their well-developed spurs show that their encounters must be far from harmless jousts. A writer from the Nilgiris says that their pugnacity is something incredible. "On one occasion, when my brother was out shooting, he heard in the jungle near him the peculiar under-toned notes that the cocks emit when fighting. After a few minutes the sound ceased, and on reaching the spot whence the sounds had proceeded, he found two Junglecocks dead, and one of his dogs by them. On examining the birds, both their heads proved to bear the marks of the dog's teeth, which could only be accounted for by the supposition that they were so busy fighting that they failed to observe the dog's approach, and were so close by pecking each other's heads that the dog seized both heads at once; for if she had seized only one, the other bird would have been out of reach before she could have made a second bite." The encounters usually take place in the morning, soon after the challenges begin. A mated bird seems to have its own particular beat and sends its alar and vocal challenges from its perch, awaiting the acceptance and approach of a rival. The unmated birds are probably those who are the actual aggressors and whose advance precipitates the battle. This explains the fact of two birds, within a short distance of each other, crowing and challenging continually day after day without attack. Both are probably mated, and concerned only with defending their chosen section of jungle and their mate. The monsoon period is the time of these encounters, while at other seasons, when, as I have related, many cocks and hens are temporarily associated in feeding, there is no hostility exhibited between the cocks.

While a cock may mate with two or three hens under certain circumstances, I believe this to be unusual, and that monogamy is the normal condition. This view is strengthened by the fact that while the cock has nothing to do with incubation, and in reality keeps at a considerable distance from his sitting mate, yet when the young are hatched he is frequently seen with them, taking his share in finding food. Such a habit could hardly have become established were he polygamous.

Within narrow limits the nest itself is rather variable. It may be a mere natural depression in the ground, devoid of any lining whatever, or it may contain the *débris* of leaves, grass or moss which existed in it when chosen by the bird. Usually the parent scratches out a hollow, almost always close against the trunk of a tree or under the shelter of some bush, which is lined with dead leaves and feathers. There are a number of records of the eggs being laid on the top of dead, half-decayed stumps, from two to four feet above the ground. Indeed, this seems to be a habit which is on the increase, and is interesting as a radical departure from the pronounced terrestrial nidification of this group.

When all the records of number of eggs are compared, there seems to be a very significant gradation from north to south, marking a regular increase. A correspondent writes that in Kanara there are never more than four in a nest, and usually three; this test being applied to many nests found early in the season, and with eggs about to hatch, thus freeing this record from the complications both of a second laying or an incomplete set. South of Mt. Abu, six to seven seems to be the average number, while in the Nilgiris and southward, eight or nine to thirteen are recorded. Whether this is due to an increase in the number of dangers or not, is an interesting speculation. In connection with this, it is significant to note that the birds from the northern part of the range seem to run larger and heavier than those from farther south. Two observers at extremes of the Junglefowl's range tell of the hen covering the eggs with dried leaves when she goes away to feed, but I can obtain no recent verification of this, while a third man, writing from Poona, emphasizes the close resemblance of the eggs to the dried leaves among which they lie.

There is great variation in the colour and size of the eggs, and when the extremes are compared it would never be supposed that they were laid by the same species of bird. At one extreme we have an egg of a long, oval shape, with a pale, creamy-white shell like that of a domestic hen; the other extreme shows a broad oval, of a deep rich buff or *café au lait*, and a coarse texture, deeply and densely pitted, like the shell of a peahen's egg. Every intermediate type is met with, some of which are everywhere thickly speckled with brownish red. The eggs vary from 43 to 51 mm. in length, and 31 to 38 in breadth, averaging 47 by 34 mm.

Several observers write me that in the north, at least, there is some evidence that two broods are reared in a season. I think this rather doubtful, and probably due to finding late broods consequent upon the first laying of eggs being destroyed. In the north, two seems to be the usual number of young reared to maturity, while in the south, I have had three reports of half-grown young in families of four, four and six respectively.

The young are able to look out for themselves soon after hatching, hiding at their mother's note of warning by squatting or scurrying under leaves or into clumps of bamboo. Not many days pass before their tiny wing-feathers are sufficiently well grown to support them. Even before they are strong enough to rise from the ground they will clamber, with the aid of feet and wings, up into shrubs and bushes, and from this point of vantage leap boldly into the air, and go off with a diminutive whirr like quail, getting up speed quickly, keeping up the pace for a few yards and then dropping exhausted into the undergrowth. Mr. T. R. Bell, of Kanara, has had Junglehens come up when he had sat for a long time, near where several little chicks were hiding, and pretend to be maimed, and when this failed, erecting their hackles and showing considerable anger. Only once was the cock seen at such a time, and he kept at a safe distance. The notes of the hen as she calls her chicks is like the voice of the domestic bird, a soft *took-took-took*, and the cock uses the same utterance at times. The *peep, peep*, of the chicks is the same infantile note as in our barnyard birds. The young birds remain with the parents at least until they have attained fully adult plumage, and how much longer is not known.

The crop of one young chick was filled with soft vegetable matter, some tiny beetles, and a single small moth. The colours and pattern of the young bird, yellowish-buff with the characteristic broad black line through the head and eye, is of great value in breaking up the general outline and approximating the hues of the jungle *débris*. This down gives place quickly to the juvenile plumage, and the first annual moult brings the bird into adult garb. About June or July the old cocks begin to moult their hackles, and possibly, sometimes, their longest tail feathers, the former being replaced at once by a short temporary plumage. Later in the year, these short eclipse feathers are replaced with the resplendent whitish or yellow hackles, and by October the bird is in perfect feather, and clears his throat for the first challenge.

RELATION TO MAN

Natives capture the Grey Junglefowl both by pegging out decoy birds, which challenge and thus attract other cocks, and by means of nooses and spring traps. When a gun is available, the jungle natives put a plan into operation which seldom fails of its purpose. They make a blind of brush and leaves near a spring of water, and wait patiently hour after hour until the birds come to drink. When there are other springs in the neighbourhood they hang pieces of white cloth about to frighten the fowl away, and thus make certain of their visiting the spring where they are keeping watch. Large numbers are killed annually in this way in the north. Although the birds are invariably thin, and consequently tough, the flesh is eaten by the natives. The hackles are valued by the makers of artificial flies for fishing, and great quantities are exported to Europe for that purpose.

In the Ghats, while the birds are still numerous in places, their numbers have been greatly decimated by the numerous snares which the natives set around every patch of rice. The jungles and dense bamboo clumps offer a safe haven for this species, and as long as such exist, it is in no immediate danger of extermination. It does not adapt itself to deforestation, however, and when any considerable area is brought under cultivation, the Grey Junglefowl retreats to the nearest dense coverts. The game laws in the Nilgiris are very generally respected by white sportsmen, and prohibit Junglefowl shooting from April 1 to September 30.

The best time for shooting Grey Junglefowl is from November to the end of March, as during that time their plumage is in the most perfect condition. Indeed, the birds are worth little else than the beauty of their feathers, for the flesh, as I have said, is very dry and hard, and even the breast possesses little real flavour. Although at times food is as abundant as could be desired, and their crops will be filled to bursting with succulent grain and seeds, yet these birds seem never to become fat, but always, like an athlete, to be in perfect condition for exercising their senses and their muscles to the utmost in detecting and avoiding danger.

"Their great timidity and watchfulness," says Davidson, "result in their yielding much less sport than the Red Junglefowl. You may get these latter in standing crops and in many other similar situations without any extraordinary precautions, but the Grey Junglefowl never goes more than a few yards inside the fields, and if a stick cracks, or a sound is heard anywhere within fifty yards, he vanishes into the jungle, whence it is impossible to flush him. Only when beating the narrow, well-defined belts of tree jungle that run down the ravines on the hillsides in the Nilgiris, and which we there call *sholas*, is anything like real sport to be got out of them. Then, indeed, the gun at the tail end of the *shola may* get three or four good shots in succession, as they rise at the end of the cover and fly off with a strong, well-sustained flight to the next nearest patch. Even thus, working hard and beating *shola* after *shola*, a man will be lucky to bag five or six brace in a day.

"The reason is, that all the well-defined *sholas* which can be thoroughly beaten are in the higher parts of the hills, where the birds are comparatively rare, while when you get lower down, where the birds are plentiful, the jungles are so large that they cannot be effectively worked. If you merely want to *kill* the birds, you might get perhaps ten or a dozen in a short time poking along some of the roads, but they afford no sport thus, only a series of pot shots.

"I remember once watching an old cock that my dogs had driven up into a tree. For some time I peered round and round (the tree was a large and densely-foliaged one) without being able to discover his whereabouts, he all the while sitting silent and motionless. At last my eyes fell upon him, that instant he hopped silently on to another bough and from that to another, and so on with incredible rapidity, till, reaching the opposite side of the tree, he flew out silently, of course never giving me a chance at a shot."

A sportsman near Mt. Abu says that the cordon system of driving "is usually adopted in shooting them here. The guns are placed behind screens made previously by the 'shikáris,' at the ends of patches of jungle the birds are known to affect, and the beaters are sent round to drive the birds up to them, forming a semi-circular line to prevent the birds escaping at the sides. It is very poor sport, you seldom or never get a flying shot, and when you do, the jungle is so thick that it is about ten to one you miss. The birds, especially the old cocks, are remarkably wary, and the moment they hear the beaters they begin to run, stopping about every fifty yards to listen.

"They have a very quick eye, and alter their course immediately if they see or hear the slightest thing in front. The only way, therefore, when you know a bird is coming, is to raise your gun silently to your shoulder, turn very quietly in the direction from which it is coming, and remain perfectly motionless, and as soon as ever the bird gets within shot, fire.

"I have shot them with dogs, but that is equally poor sport. As soon as the Junglefowl sees the dog, he flies up into a tree and squats upon a bough until you dislodge him from his supposed place of security with a charge of shot."

Dr. G. H. Krumbiegel, superintendent of the Mysore Museum, writes me that in Mysore the Grey Junglefowl is protected from March 1 to September 1, but that natives shoot them throughout the year. The method usually adopted is to sit in ambush over a water-hole, or feed the birds regularly at a certain spot, and when they are well together feeding, to "brown" the lot. A shikari will sometimes call up a cock by imitating the hen. The sound is a very soft note, and one would scarcely think the cock would hear it thirty or forty yards away, but he rushes along impetuously within half a minute. The Kurbars track Junglefowl, but the people who destroy them to the greatest extent are the Pardees, a wandering tribe in Mysore, whose only occupation is poaching. The Kurbars use dead-falls of sorts, and also drive stakes about fifteen inches high into the ground close together to form a circle about two feet in diameter, in which grain is placed, and the birds learn to feed through two openings which are left open for the purpose. After a while, a very ingenious arrangement made of bamboo, on the principle of a scissor trap, is placed at the opening, into which the bird gets its head and is killed. The Pardees approach the feeding birds under cover of a bull, and a line of nooses having been set, they mill around until the birds are close to the line. They then suddenly leap out and scare the birds, and in their rush to escape many are caught by the neck or leg. Any one who has tried to get even within gunshot of such birds will realize the skill which these natives must possess to successfully carry out this method of attack.

CAPTIVITY

The Grey Junglefowl was first bred in Europe in 1862, when thirteen hybrids with the red species were reared in the London Zoo. Since then it has been bred many times in various public and private aviaries, both pure and as crosses. Of twelve birds of which records were kept in the London Zoo, one notable individual lived twelve years and four months, the average length of life of the others being two years and a half. The period of incubation lasts from eighteen to nineteen days. A pair of these birds bred successfully in the aviary of F. E. Blaauw in Holland. The hen laid three successive times, in clutches of four eggs each, and from these ten birds, five cocks and five hens, were reared. The first two layings were taken away and set under bantam hens, while the last lot of four was left to the mother, who sat faithfully and hatched them all. The richly-coloured chicks thrived on ants' eggs, and assumed their adult plumage in the first autumn.

When the eggs of wild Junglefowl are brought in and hatched under a domestic hen, the chicks remain contentedly with the mother until they are able to fly, when they roost at night by themselves on some bush or low tree. When a few months old they invariably retreat to the jungle, and do not return. Grey Junglefowl seldom become tame in captivity, certainly not more so than the average pheasant. While there is no doubt that the red species is the direct ancestor of all of our poultry, the rather close relation of the grey bird is shown in the facility with which it crosses with the descendants of its generic relative. In the native villages of Kanara and elsewhere, it is not a rare sight to see hybrids which possess more or less perfectly the bright sealing-wax hackles of one parent, while they have inherited sufficient domestic instincts to induce them to remain with the other inmates of the compound.

DETAILED DESCRIPTION

Adult Male.—The feathering of the head is confined to a narrow line of reddish, rather recurved feathers between the comb and eye, and a small rounded tuft of silvery-white feathers covering the ear. The face, chin, and throat appear naked, but are evenly but thinly covered with a scanty growth of filo-plumes, each a simple hair-like shaft, or tipped with several rudimentary barbs. Immediately back of the comb the feathers take on the character of the hackles as a whole. The smallest of these show a small spot, flat and enamel-like, framed in black, with the base of the feather white. As we proceed backward over the neck, the feathers gain in complexity. The longest hackles are well over 100 mm. in length, and strung along the centre of the vane they show as many as four distinct, specialized, enamel-like patches. This is in no sense an enlargement of the rhachis or shaft, but a solidification or cornification of the vane as a whole. The barbs all run into this area, and distally emerge from it, unchanged as to their position in the vane as a whole. The sealing-wax simile is a perfect one. If one took any normal feather and dropped four beads of sealing-wax at intervals along the shaft, allowing them to spread over about half the width of the vane, the hackle spots would be perfectly imitated. The terminal waxy spot soon becomes frayed and split, and when the wear and tear thus becomes apparent, it presents the appearance of the margin of a palm frond.

The hackles have a wide, disintegrated fringe of grey, the remainder of the feather being dark-brown or black. The concealed spots are always pure white, but the terminal wax may be either white or tinged with pigment until it is of a deep yellow ochre. The free unmodified part of the vane may be grey-fringed to the tip, or it, too, may be heavily stained with yellow. The extremes of these two colours are birds very unlike in appearance, but the variation is dependent neither upon age nor locality. There is sometimes a hint of a proximal fifth area of specialization, and often this is so rudimentary that the modification has affected pigment only, the node being white, but wholly normal in structure. The dark portions of most of the longer hackles are strongly glossed with violet and purple.

The hackles, besides extending backward over the whole mantle plumage, are continued around the sides of the bare neck until they almost meet in front on the lower neck.

On the lower hind neck the hackles give place abruptly to the normal plumage of the mantle. These and the majority of the body feathers and the lesser wing-coverts are dark-brown or black—dull in some individuals, in others glossed with purple—narrowly edged with grey, and with still narrower white shaft-stripes. There is sometimes considerable grey mottling in the dark area, regardless of age, but usually this is lost in the fully adult bird.

The purple gloss is accentuated on the rump feathers, and in addition a series of the small, wax-like ornaments appears, and the visible fringe is deep orange-red. The shorter upper tail-coverts are bronze-purple, the longer ones purplish-blue, with a marginal band of greenish. The tail-feathers are black glossed with bluish-green, on both webs in the central, on the outer web alone of the lateral rectrices.

On the median wing-coverts occurs another extremely specialized zone; if anything even more extreme than that of the hackles. The enamelled area is so extensive that in full-plumaged birds it forms a broad, solid zone across the wing. The proximal part is formed by feathers which have but the merest tip of waxy structure, while in the posterior part of this wing area the feathers are solidly cornified for some 30 mm. of their length, the entire distal part of the vane being thus affected, and the colour being a rich ochre. Where any part of the visible portion of the vane is free, it is orange-red. The greater primary coverts are dull, dark-brown, while those protecting the secondaries are glossed with purple, with only a white shaft-mark to hint of the specialization in the adjoining feathers. Flight-feathers brownish-black, the primaries faintly edged with pale grey, and the secondaries glossed with greenish.

Under-parts like the back, but with much more greyish-white on the fringes and shaft-stripes. Indeed, posteriorly, the black becomes restricted to two broad longitudinal bands. A patch of feathers on the sides of the belly and the flanks shows a tendency to form another zone of specialization, but here we find only an abundance of the orange-red pigment, with little or no cornification of the vane.

Comb, wattles and bare skin of head, chin, and throat red, very intense at the season of courtship, and often extending far down the neck under the clothing of hackles. Upper mandible dark-brown or black, paler at the tip; lower mandible yellowish horn. Irides varying from clear red, through reddish-orange to yellow. When in full colour the legs and feet are salmon red, and the claws black. After death and at other than the breeding season, a yellowish hue predominates.

Length, 700 to 800 mm.; culmen from nostril, 16; wing, 240; tail, 380; tarsus, 77; middle toe and claw, 64. Spur long, slender distally and much curved, 30 mm. in length. Weight 1 lb. 9 ozs. to 2 lbs. 9·5 ozs.

VARIATION AND ANNUAL MOULTS

In examining a large series of skins, some from areas of dense, humid jungle, and others from semi-arid regions, I can detect no correlated difference in colour. I have already spoken, however, of the considerable variation in individual cocks, regardless of age or locality. This is most pronounced in the hackles, in which the terminal enamelled spot may be pure white or rich yellow ochre. Then, too, in cocks of equal age, the body plumage may sometimes lack the iridescent gloss, while the amount of white varies within wide limits. The absence of gloss and excess of white are also, however, marks of immaturity.

In June or July, when the duties of the breeding season are quite over, the hackles begin to be dropped. This moult of the hackles is of great interest as being an eclipse moult of short duration. From the forehead back to the lower neck, and around, almost meeting on the ventral part of the neck, the shed hackles are at once replaced with black feathers. Those on the head have white, hair-like shaft-stripes, while the larger ones are faintly glossed with purple. There is absolutely no trace of the specialised waxy spots, and the whole aspect of the bird is altered. These black feathers are retained until the regular annual moult sets in, some three months later, when they, together with the entire body and wing plumage, are shed, and replaced with resplendent new feathers. The early shedding of the long, central tail-feathers is irregular. They are often broken off at this season after the wear and tear of the period of battle and of breeding, so that they do not project beyond the other shorter tail-feathers. In ten specimens in eclipse plumage, six had the feathers thus broken, and hence apparently moulted; in two others they were present and full length, although much worn, the eclipse hackle plumage in this case already showing signs of being shed. In two other birds the central tail-feathers were shed; but so were one or two of the other rectrices adventitiously from one side, showing that the regular rectrice moult, from outside in, had not yet begun. Thus there seems no ground for belief in the widely-repeated statement that the central pair of tail-feathers is shed simultaneously with the hackles. After two or three months, in the course of the autumn, all the cock's ornaments are again assumed by a second moult of these feathers.

Adult Female.—Feathers on the head brown or dull orange, shading into rusty or rufous on the neck and mantle, and paling into buffy-white on the rear mantle. These feathers have all two broad, longitudinal lines of black extending down the vane. All the remaining upper plumage, together with the wing-coverts and visible portion of the secondaries, is a fine mottling or vermiculation of sandy or rufous brown and black, the back, the lesser and median coverts with a conspicuous, hair-like, white shaft-streak. Primaries plain dull brown. Tail-feathers black, slightly glossed with greenish, the central pair with a marginal mottling of reddish-brown.

The face is covered with a scanty growth of brown featherlets, the chin and throat with a somewhat denser plumage of white. The pattern of the ventral plumage is of a central area of white and a wide black or dark-brown border. The white increases posteriorly, until on the mid-belly it obliterates the dark marginal colour. There is considerable mottling, however, of the white area, in the form of two irregular longitudinal lines in the centre of the vane. The under tail-coverts are dark-brown, with a small, terminal, white shaft-spot.

The comb is very rudimentary, 3 or 4 mm. in height, slightly notched. The spurs are short, rounded nodules. Upper mandible dark horny-brown; lower yellowish-white. Irides red to yellow; facial skin reddish, never as bright as in the cock. Legs and feet brownish yellow, darker on the toes. Length, 380 mm.; culmen from nostril, 19; wing, 200; tail, 145; tarsus, 63; middle toe and claw, 50 mm. Weight 1 lb. 9 ozs. to 1 lb. 12 ozs.

Chick in Down.—The lores of a week-old chick, and a line backward around the edge of the eyelids, and on over the ear-coverts and around to the nape, dark chocolate brown. A V-shaped mark, with the apex on the mid-crown, and extending backward to the nape, where it meets the two lateral facial lines, is dark chocolate brown, with a narrow bordering line of black. All the rest of the head, neck and breast yellow buff. Chin and throat creamy white. The chocolate band is continued in an even width down the back to the rump. The side mantle, anterior wings and sides are buffy brown or fawn colour. The new sprouting scapulars and wing-coverts are tipped with greyish-white. From the mid-back to the rump, the central chocolate band is flanked by two creamy white stripes of somewhat lesser width, and outside of these we find still another pair of narrow chocolate lines. The under surface and thighs are creamy white. The wing-feathers are pale sandy peppered with darker brown.

Culmen from nostril, 5·5 mm.; wing, 55; tail, 18; tarsus, 20; middle toe and claw, 19 mm.

Juvenile Plumage.—When the down of the head is shed, it is replaced by a fairly dense growth of brownish-black feathers. The comb at this time is small and rounded, exactly like that of the adult hen. The head and neck hackles of this plumage show no hint of the succeeding specialization, nor do they resemble the corresponding feathers of the female, but they are very much like the post-nuptial eclipse into which

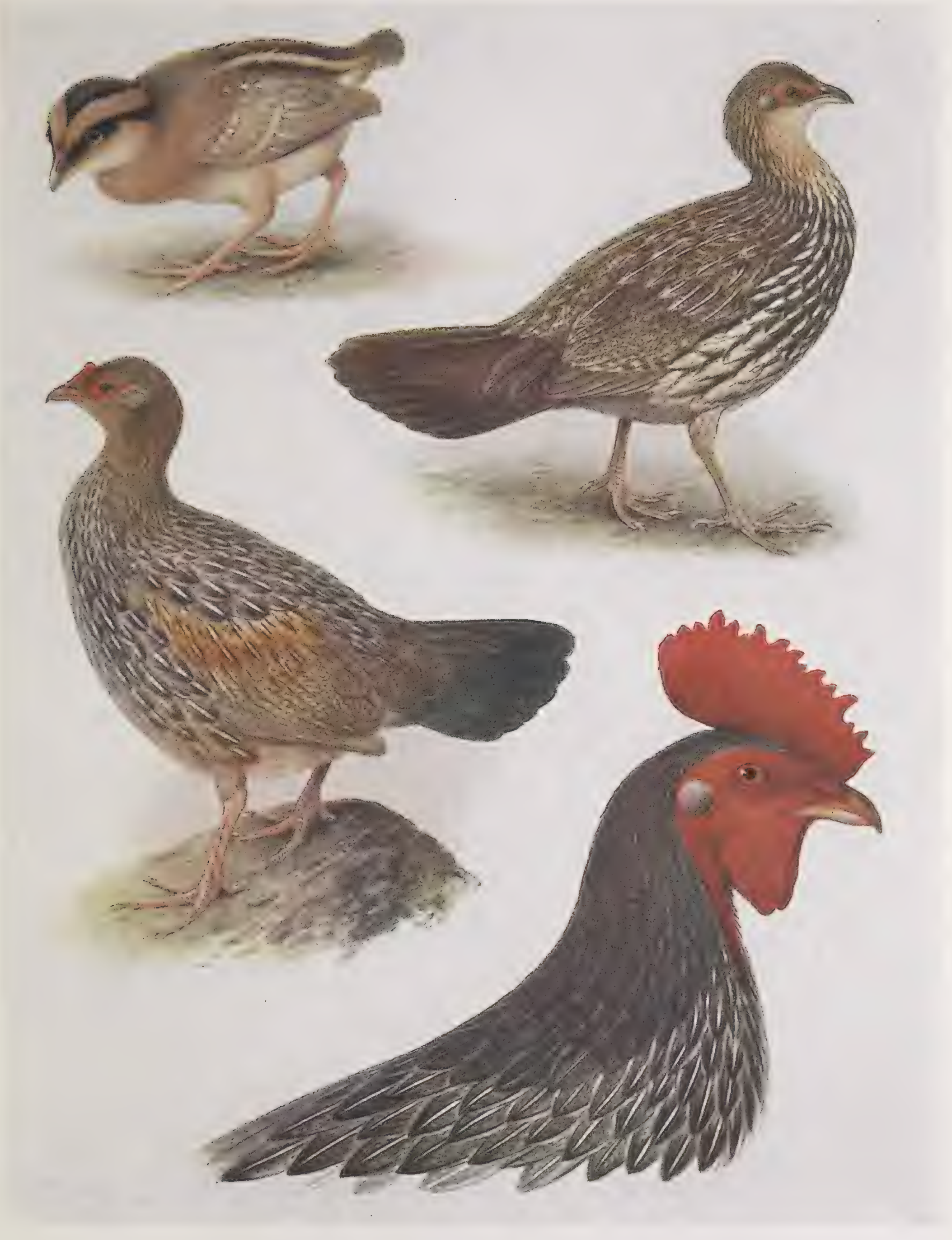
PLUMAGES OF THE GREY JUNGLEFOWL

Gallus sonnerati Temminck

The chick in down has very distinct patterns and coloration, and the wing-feathers sprout rapidly so that it can fly a short time after hatching.

The juvenile plumage of both sexes resembles that of the adult female, with usually a hint of the sealing-wax spots on the median wing-coverts of the cock.

A full-grown cock in the eclipse plumage has the specialized neck hackles replaced with black ones. This partial moult lasts only for three months after the breeding season.



PLUMAGES OF THE GREY JUNGLEFOWL.

the adult cock moults every year. They are black, with a faint violet gloss, a wide greyish or rusty fringe and a very narrow shaft-streak. The lower mantle, back and rump show somewhat the same general pattern, but lack the gloss and have much more adventitious mottling. The grey fringe is much whiter.

The primaries are plain brown, but the visible parts of the greater coverts and the secondaries are thickly mottled and vermiculated with sandy brown. The median coverts are most interesting as showing well-developed waxy spots of yellow ochre, and terminal shading of reddish-orange, hinting that this zone of specialization is older than the others. The tail-feathers, like the secondaries, are much mottled. The under parts are very similar to the plumage of the adult cock, with the colours less distinct and separate. There is sometimes a slight tinge of orange on the flanks.

In the full-grown juvenile bird, both the irides and the feet and legs are yellowish-brown. The upper mandible is brownish, duller than in the adult, and the lower mandible yellowish. The comb and facial skin are pink. Length, 380 mm.; culmen from nostril, 14; wing, 200; tail, 125; tarsus, 70; middle toe and claw, 55 mm.

POST-JUVENILE OR FIRST ANNUAL MOULT.—With this moult the adult plumage is attained, the chief difference from the juvenile plumage being the acquisition of the specialized hackles and central tail-feathers. There is a great deal of variation, however, in the amount of clearing up of the plumage, and in birds which have moulted early the waxy hackles are very imperfectly developed and the general body plumage and wing-feathers much mottled with brown or sandy.

EARLY HISTORY

Under the name *Coq et Poule sauvage des Indes* we may recognize the Grey Junglefowl in Mon. Sonnerat's *Voyage aux Indes Orientales et à la Chine*, which was "*Fait par ordre du Roi, depuis* 1774 *jusqu'en* 1781." He gives a long, rambling description of both cock and hen, and a black-and-white engraving vaguely showing the sealing-wax hackles, but nothing of the habits or life of the bird. His final conclusion is the very erroneous one that this Junglefowl represents the progenitor of our breeds of domestic fowls. Other authors simply copy Sonnerat or enlarge on his facts with sad effect. All agree with his theory of descent, until Temminck in 1813 proves conclusively that this is an error, and names the bird in question after its first describer *Gallus Sonneratii*.

SYNONYMY

Coq et Poule sauvage des Indes Sonnerat, Voy. Ind. Orient, II. 1782, p. 148, pls. 94, 95.

Wild Cock Latham, Gen. Syn., II. 1783, p. 698.

Phasianus gallus Scop. (nec Linn.), Del Flor. et Faun. Insubr., pt. II. 1786, p. 93; Gmelin, S. N. I., pt. II., 1788, p. 737; Latham, Ind. Orn., II. 1790, p. 625; Bonnat. Tabl. Encycl. Méth., I. 1791, p. 180, pl. 86, figs. 4, 5.

Sonnerat's Wild Cock Latham, Gen. Hist., VIII. 1823, p. 181.

Gallus sonnerati Temminck, Pig. et Gall., II. 1813, p. 246, III. 1815, p. 649; Steph. in Shaw's Gen. Zool., XI. 1819, p. 200, pl. 12; Temminck, Pl. Col., V. 1823, pls. 1 and 2, Nos. 232, 233; Vieillot, Gal. Ois., II. 1825, p. 26; Griff. ed. Cuv., III. 1829, p. 19; Lesson, Traité d'Orn, 1831, p. 492; Sykes, Proc. Zool. Soc., 1832, p. 151 [W. Ghauts]; Schinz, Nat. Abbild. Vög., 1833, p. 243, pl. 94; Jard. Nat. Lib. Orn. 1834, p. 186, pls. XI. and XII.; Gray, List of Birds, pt. III. Gall., 1844, p. 27; id. Gen. B., III. 1845, p. 499; Blyth, Ann. Mag. N. H., XX.

1847, p. 388, I. 1848, p. 455 ; id. Cat. Mus. As. Soc., 1849, p. 243 ; Schinz, Nat. Vög., 1853, p. 145, pl. 69 ; Burgess Proc. Zool. Soc., 1855, p. 29 ; Sacc, Rev. Zool. (2), XIV. 1862, p. 11, pl. 3 ; Sclater, Proc. Zool. Soc. London, 1862, p. 186 [first breeding in captivity] ; Jerden, Birds India, III. 1863, p. 539 ; Sclater, List of Phas., 1863, p. 10 ; Bulger, Proc. Zool. Soc. 1866, p. 571 [Nilghiris] ; Ornithogonomon, Field, XXVIII. 1866, p. 183 [general account] ; Tegetmeier, Field, XXVIII. 1866, p. 191 [characters of hybrids] ; Gray, List Gallinae Brit. Mus., 1867, p. 39 ; Blyth, Ibis, 1867, pp. 154, 307 ; Sclater, Proc. Zool. Soc. London, 1869, p. 628 [breeding in London Zoo] ; Gray, Hand-list, B. II. 1870, p. 261 ; Elwes, Ibis, 1870, p. 528 [Cardamum Hills] ; Elliot, Mon. Phas. II. 1872, pl. 34 ; Nathusius, Jour. für Orn., 1872, p. 329 [shell characters] ; Lloyd, Ibis, 1873, p. 401 [S. Konkan] ; Hume, N. and E. Ind. B., 1873, p. 531 ; Butler, Stray Feathers, IV. 1876, p. 5 [M. Guzerat and Aboo] ; Fairb., Stray Feathers, IV. 1876, p. 262 [Khandala to Goa] ; Hume, Stray Feathers, IV. 1876, p. 404 [Travancore] ; Butler, Stray Feathers, V. 1877, p. 222 ; Fairb., Stray Feathers, V. 1877, p. 409 [Palani Hills] ; Marshall, B. Nest Ind., 1877, p. 59 ; Gould, B. Asia, VII. 1877, pl. 56 ; Hume and Marshall, Game-birds India, I. 1878, p. 231, pl. ; Davidson and Wend., Stray Feathers, VII. 1878, p. 86 [Deccan] ; Butler, Cat. B. Sind., 1879, p. 53 [Aboo] ; McInroy, Stray Feathers, VIII. 1879, p. 493 [Mysore] ; Vidal, Stray Feathers, IX. 1880, p. 76 [S. Konkan] ; Butler, Stray Feathers, IX. 1880, p. 205 [Belgaum], p. 421 [Deccan and S. Mahratta] ; Schmidt, Proc. Zool. Soc. London, 1880, p. 315 [viability in Frankfort Zoo] ; Davidson, Stray Feathers, X. 1882, p. 316 [W. Khandeish] ; Davison, Stray, Feathers, X. 1883, p. 409 [Nilghiris, Wynaad and S. Mysore] ; Sclater, List Animals in Gardens Zool. Soc. London, 1883, p. 488 ; Swinhoe and Barnes, Ibis, 1885, p. 131 [Central India] ; Taylor, Stray Feathers, X. 1887, p. 464 [Manzeerabad, Mysore] ; Terry, Stray Feathers, X. 1887, p. 479 [Palani Hills] ; Oates, ed. Hume's Nests and Eggs, III. 1890, p. 420 ; Barnes, Jour. Bombay Nat. Hist. Soc., VI. 1891, p. 2 [Mt. Aboo : habits] ; Laurie, Jour. Bombay Nat. Hist. Soc., VI. 1891, pp. 93, 98 [laws for protection] ; Grant, Cat. Birds Brit. Mus., XXII. 1893, p. 350 ; Grant, Hand-book Game-birds, II. 1897, p. 55 ; Davidson, Jour. Bombay Nat. Hist. Soc., XII. 1898, p. 63 [North Kanara] ; Oates, Game-birds India, I. 1898, p. 371 ; Sharpe, Hand-list Birds, I. 1899, p. 39 [South and Central India Peninsula] ; Nehrkorn, Kat. Eiersammlung, 1899, p. 194 ; Betham, Jour. Bombay Nat. Hist. Soc., XIII. 1900, p. 383 [Poona : Nest and eggs] ; Oates, Cat. Birds' Eggs Brit. Mus., I. 1901, p. 60 [Eggs] ; Ghighi, Mon. Zool. Ital., XIV. 1903, p. 319 [generic characters] ; Jukes, Jour. Bombay Nat. Hist. Soc., XIX., 1909, p. 216 [laws for protection] ; Finn, Avic. Mag. (3), I. 1910, p. 129 ; Mitchell, Proc. Zool. Soc. London, 1911, p. 522 [viability in London Zoo] ; Stubbe and Rowe, Zoologist (4), XVI. 1913, p. 13 [prehistoric origin] ; Ghighi, Mem. R. Accad. Bologna (7), III. 1916, p. 1 [crossing with domestic fowl] ; Baker, Jour. Bombay Nat. Hist. Soc., XXIV. 1917, p. 21.

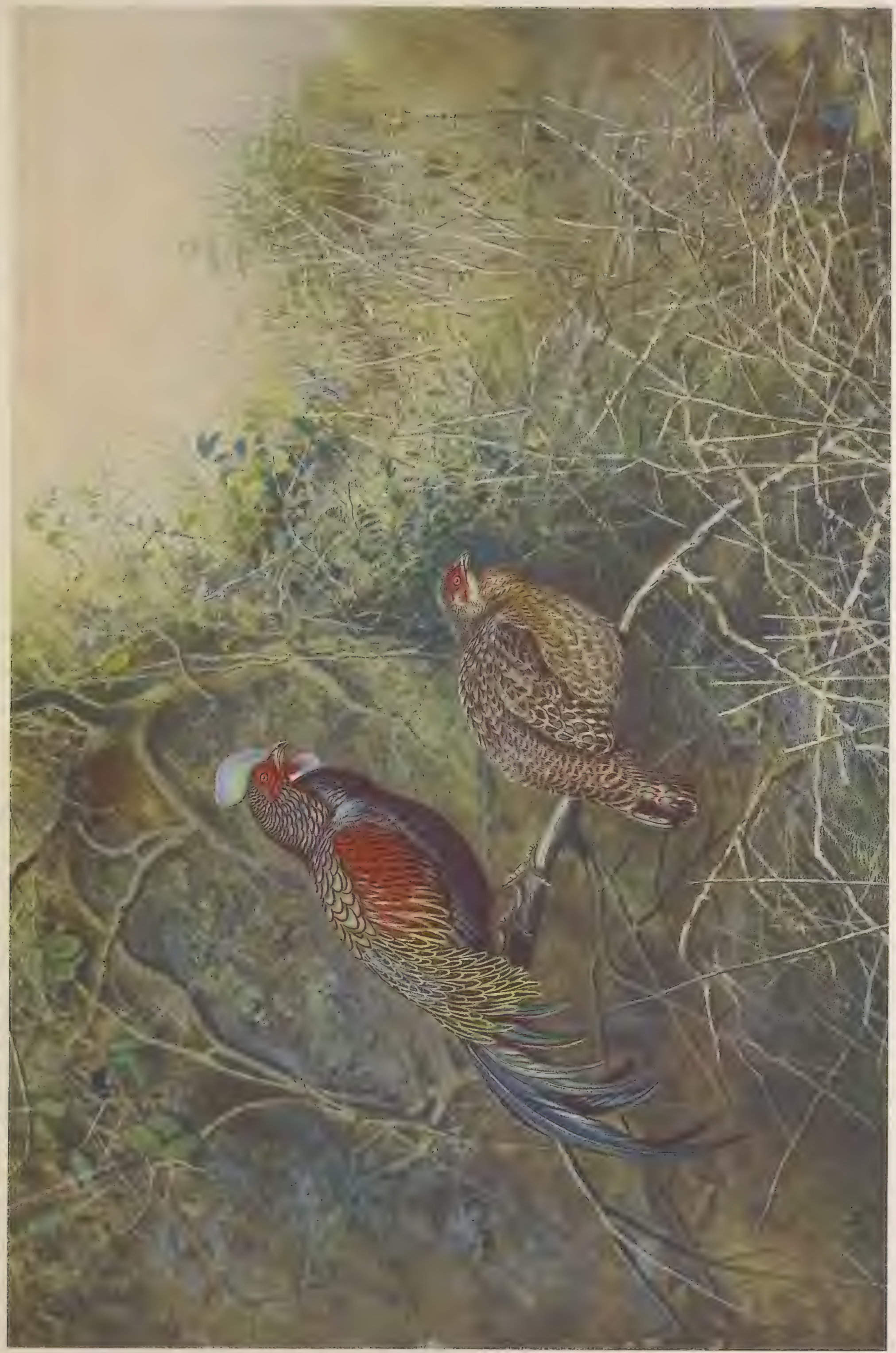
Phasianus indicus Leach, Zool. Misc., II. 1815, p. 6, pl. 61.

Sonnerat's Junglefowl Blaauw, Avic. Mag. N. S., VII. 1908, p. 37 [breeding in captivity].

JAVAN JUNGLEFOWL

Gallus varius (Shaw and Nodder)

Early in the morning, before the sun appeared, picking my way quietly through a tangle of cactus on the low-lying Javan coast, with a shrike sitting in every tree, with bulbuls singing from every thicket, there would come across the valley a sharp, crisp, virile *chaw-au-auk!* the challenge of the Javan Junglefowl. With erect iridescent comb and plumage glittering with dew, the splendid wild fowl was leading his family from their roosting-place to the nearest pool of water for their sunrise drink.



JAVAN JUNGLEFOWL.

JAVAN JUNGLEFOWL

Gallus varius (Shaw and Nodder)

NAMES.—Specific: *varius*, from the variegated character of the plumage. English: Green, Fork-tailed, or Javan Junglefowl. French: Coq ayamalas. Native: *Ajam oetan* (Javanese Malay); *Ajam alas*, *Pittè wono* (Javanese); *Ajam leuweung* (Sudanese); *Baki koek*, *Bekikko* (Javanese); *Kasintoe* (Sudanese). The two latter names are also applied to *Gallus gallus*. Hybrids between *Gallus varius* and native poultry are known as *Bekisar* or *Kakok*.

BRIEF DESCRIPTION.—Male: Rounded comb green and purplish red; single, median throat wattle brilliantly coloured red, yellow and blue. Top of head, neck and upper mantle of short, square-tipped feathers, black, edged with greenish-bronze; lower mantle shining green, fringed with black; lower back and rump elongate, narrow feathers, black, edged with pale yellow; lesser and median wing-coverts similar, but with an orange-red fringe; tail glossy green; flight feathers and lower plumage black. Female: Head, neck and mantle sandy brown, with an indistinct, concentric black band; rest of upper parts black, usually glossed with green, irregularly barred and margined with buff; bars on secondaries buffy white. Throat white, under parts pale buff with darker margins and indistinct mottlings.

RANGE.—The islands of Java, Madura, Kangean, Bawean, Bali, Lombok, Sumbawa, Flores and Alor.

THE BIRD IN ITS WILD HOME

THREE birds flying out to sea: such was my sensational first meeting with the Green Javan Junglefowl, amid a scene of rare beauty—the perfect close of a tropical day on the very north-east tip of the Javan coast.

For hours I had motored over dusty roads in the shade of mile after mile of great tamarinds, and now, in late afternoon, I was sitting spellbound by the beauty of the sunset. I had camped on the tip of a little promontory jutting out into the Java Sea. Behind was an all but impassable *chevaux-de-frise* of cactus, and overhead and on to the east, rank after rank of feathery palms and bamboos. I was almost suspended in air, for directly beneath me were great caves hollowed out by the water, in and out of which dashed tiny swiftlets—makers of the edible birds' nests. Seaward lay fair gardens—every limestone pool left by the tide a mass of colour, blossoming coral—pink, green and brown; great serpent starfish, like animated sessile Compositae; wandering patches of lettuce—the green-leafed nudibranchs. Beyond all this, five rows of great breakers boomed on the waste of jagged rocks.

On either hand a deep bay swept inward, tracing its lines by the white of the waves, and to the west, just out of the path of the setting sun, a tiny islet of mangroves raised its head bravely far from shore.

Between the crashes of the waves I could hear the *wheenk!* of a Javan nighthawk, the sharp twitters of the swiftlets, and now and then the plaintive whistle of a distant sandpiper. A host of little bats appeared and gyrated about my head; and then, high up in mid-air, great flying foxes passed slowly over. Herons, no less graceful, began to collect from far and near in threes and fives, flying low, and headed straight for the mangrove islet. As they crossed the sun's path, they became silhouettes of ebony; when they swung up to their roost, they showed as purest ivory against the dark foliage. Forty, fifty, seventy came, all concentrating on one or two of the trees.

Of the colours of such a scene none may write. The maze of rose, salmon, scarlet, violet, mauve, and the hundred unnamed tropical tints, succeeding one another and staining sky and sea and land, defy pen as well as brush.

The afterglow of softened tones of orange and yellow had come, glowing strongest from the east, as if a new dawn had begun, when three birds walked quietly out of the bushes, and picked their way over the high tide drift-line of shells and corals. They were Green Junglefowl—two cocks and a hen, all young birds of the year. Even in this faint light I could catch an occasional metallic glint from the plumage of the leader as he scratched half-heartedly here and there among the shells. The small size of his comb and tail and the buff marks on his wings clearly betrayed his immaturity.

The hen stabbed at a prickly pear fruit, and buried its beak deep in the rosy juice; another chased a flying insect. After a few minutes one of the cocks crouched and sprang into the air with a low cackle, and his two companions were on the wing a moment later. Up and up they went, out over the breakers, straight, as only birds can fly, to the mangroves. They almost vanished from my straining eyes before they landed, but I could see a branch bend beneath their weight before the afterglow snuffed out like a candle and the faint silver of the crescent moon began its dance on the ripples. The night wind arose, swept through the palm fronds and clattered their frilled edges together like a myriad castanets; the air was filled with the aromatic incense of leaves which I had crushed underfoot, and the last sound in my ears was the lulling crescendo boom of the breakers.

GENERAL DISTRIBUTION

The Javan Junglefowl bears the distinction of being the only member of the group included in this monograph whose home lies altogether south of the equator. It resembles its congener, the Ceylon junglefowl, in being confined chiefly to one large island.

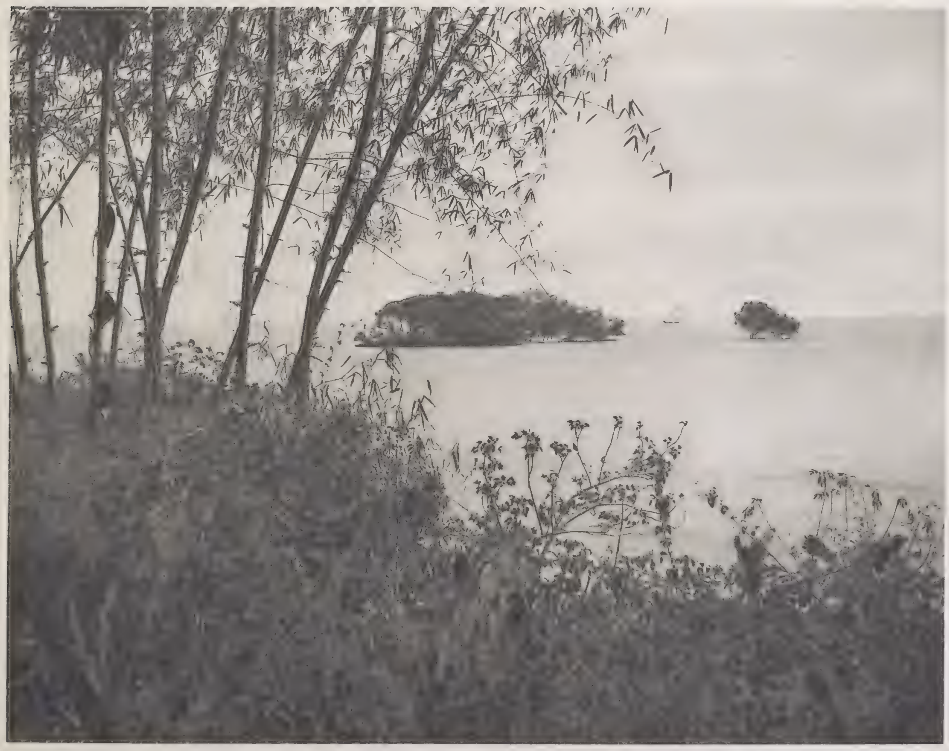
It is a bird of the drier coastal belt, extending inland along the lower valleys, and in some cases ascending the mountains to a considerable height, but always in places where the configuration of the land results in a lessened degree of humidity. I have no reliable record of its occurrence over twenty-three hundred feet, and at this point it is very rare, and shifts downward at the beginning of the rains.

Besides this altitudinal, the species has a marked longitudinal distribution in Java. It is found in greatest abundance on the east and north-east coasts, becoming more rare as we approach the western end of the island, where in many places it is altogether absent. As one of many examples of the data on which I base this statement, I found that on most of the big estates in the Preanger the red junglefowl is well known, while the Javan bird had never been seen or heard of. This is in country lower than one hundred feet elevation, from the sea-coast to a distance of forty miles inland.

This eastern concentration of numbers becomes an actual centre of distribution when we add to this area the two easterly-stretching chains of small islands: Madura and Kangean to the north, and Bali, Lombok, Sumbawa, Flores and Alor to the east.

HAUNTS AND ROOSTING ISLAND OF THE JAVAN JUNGLEFOWL

This bird haunts the semi-arid coastal lands of Java, but, not satisfied with its proximity to the booming surf of the tropical sea, I saw two cocks and a hen walk down to the beach, catching insects as they went, and after some hesitation rise into the air as easily as quail, and fly out to a tiny mangrove islet a hundred yards off-shore. Here they found a safe roost for the night, returning to their feeding-grounds in early morning.



HAUNTS AND ROOSTING ISLAND OF THE JAVAN JUNGLEFOWL.

The sixth and last bit of dry land inhabited by the Javan Junglefowl is the isolated islet of Bawean, due north of eastern Java.

Rather curiously, the distribution of this Junglefowl in the small island of Madura is similar to Java—the birds being found only in the eastern part.

GENERAL ACCOUNT

To the visiting ornithologist, Java is one of the most difficult countries in the East in which to get orientated for any definite work. The island is so densely populated that it would seem a matter of but a few casual inquiries to learn much of the habits, or at least of the haunts, of so conspicuous a bird as the Green Junglefowl. I had indeed no lack of proffered help, but all of so indefinite a nature that it was more of an embarrassment than assistance. The very names were most confusing, all, at various times and places, being interchangeable, both the terms for the red and the Javan Junglefowls and the hybrids between the latter and domestic poultry. When one was certain that one had mastered the local names for these species, an enthusiastic Dutchman or Javanese would go to great pains to point out some water fowl as the bird intended. Many well-intentioned people sent me such a résumé of the Junglefowl's habits as the following: "They nest in holes in trees, laying eighteen eggs, white, spotted with red. The round eggs produce hens, the long eggs only cocks. They fight all day for their food. They never moult their feathers!"

Our ignorance of the Javan Junglefowl has been so great that I was particularly anxious to make our knowledge of the life history of this interesting bird as complete as possible, especially as with the increasing density of population it cannot survive many more decades. In English ornithological literature we find practically nothing, and in the Dutch reports the facts are so vague or so conflicting that I have been able to place no reliance upon them.

There is no doubt that the Javan Junglefowl does occur in the wooded mountains where I have myself seen it, but it is of uncommon occurrence, and this rarity is not because of the difficulty of finding it in the dense forests, but an actual status. In the interior a favourite haunt is a deserted coffee plantation, partly overrun with jungle. As we approach the drier coastal area, especially towards the east, the bird becomes more abundant, and in several different places, within sound of the waves beating on the coral reefs, I have found it in large numbers. In such localities one is at once struck by the general superficial resemblance between the country and the corresponding haunts of the Ceylon junglefowl. Here, in the region most favoured of the Javan bird, is no hint of jungle. Leaving behind the lofty, humid, dense-jungled mountains of the interior, we find a narrow coastal belt of low, rolling, or level country, covered for the most part with a stunted, semi-desert vegetation. So much alike is all this region, that an account of one locality, that in the vicinity of Patjiran, may well stand as representative of the typical home of this Junglefowl.

My studies of this species began early in September. At this season the whole earth cried out for the rains which had not yet begun. The rainy season is usually November, December and January, but there is often more or less condensation of moisture in October.

Leaving the rest-house, or *pasanggràhan*, I made my way through cactus hedges and across ploughed fields, and climbed a steep limestone ridge three or four hundred feet high. At the summit was a huge, balanced boulder, and from its rounded, weather-worn back I could overlook many miles of country. Here I began my systematic study of the wild life of the Javan Junglefowl, after having wasted weeks of fruitless search in the west of the island following up false reports.

These limestone ridges are very characteristic of this north-eastern coast, forming sometimes low lines of hills extending inland, often at right angles to the shore. Between these run small streams, and up to the very slopes of the ridges almost every patch of ground is given over to rice, tapioca, ground bean, Indian corn, or castor oil.

In the case of most of the birds of the family of pheasants treated of in this monograph, one is concerned chiefly with their wild surroundings, but the Javan coast is almost a solid band of cultivation, and we are forced to link this Junglefowl very closely with this human environment. Farther inland a few stragglers may live in comparative isolation, but here, in its typical home, one is never out of sight of the native fields. The dull, native Javanese think of little else besides their fields, and crave no flesh besides their dried fish, so the Junglefowl are seldom disturbed.

At this season the grass was dry, the bushes and vines crackled at a touch, and even the cactus pads looked yellow and shrivelled. As I climbed the ridge, the sun beat down with terrific force. Even the butterflies—the yellows and the reds—often sought the shade of tiny stones. Everywhere on the ridge the steel-grey weathered limestone cropped out in a myriad points and sharp edges. One's shoes were soon cut up; a single sweep of the butterfly-net reduced it to tatters. For the vegetable life, too, as if following out some law of this region, Nature provided a thousand spikes and thorns and briers.

Toward the summit of the ridge I began to feel the cool sea breeze, which brought no moisture, but which, because of its very dryness, made the great heat easy to endure. The rocks stood up more boldly the higher I ascended, and great water-worn fissures and crevices appeared. In one place I found a well-worn little path, feathers, and abundance of Junglefowl sign. Here I could look down and inward twenty feet or more, and see the light from the other side of the ridge shining through. So somewhere in the cool ramifications of this rocky maze these birds, as I subsequently made certain, spent the heat of the day, and here some of them roosted at night.

From his lookout on the summit of the ridge, a Junglefowl, emerging at dawn from this roosting-cavern, would see the steep slope dropping rapidly away, a mass of cacti draped with a tangle of briers; stubby treelets like Japanese stunted conifers; and aromatic shrubs and herbs, smelling of mint and pennyroyal. Like a myriad toadstools, the sago and cocoanut palms dot the fields, and now and then a feathery wisp of giant bamboo, at this distance appearing exactly like a graceful clump of ferns. Winding up and down the slopes, enclosing only fields of pointed coral rock, are frail stone walls, built of heaped-up bits of angular limestone, all half-hidden by sprawling cactus.

Farther to the west, in a broad, low valley between two ridges, I found that Junglefowl abounded. And here I spent many hours, concealed either in my umbrella tent, or behind a sheltering blind of cactus. At early dawn the birds would work down from the ridges, in small parties of two to five, passing in single file through the corners of

ROOSTING CLIFF AND HAUNTS OF THE JAVAN JUNGLEFOWL

JAGGED ridges of weather-worn coral and stony fields covered with a scanty growth of grass; spiny cacti sprouting everywhere, and an occasional palm or bunch of feathery bamboo—such is the home of the Javan Junglefowl along the coast. In one place I found a number roosting in a limestone cavern beneath the level of the ground. The birds make their way to the more fertile spots near the creeks and search for insects along the rice-fields and crops of ground pea.

ROOSTING CLIFF AND HAUNTS OF THE JAVAN JUNGLEFOWL

the fields. In the lowest part of the valley was the growing rice, and here they would scurry swiftly along the enclosing embankments, frightening up the large doves as they went. Now and then one would take a low, short flight across a stretch of rice, the passing shadow of the bird sending out a flurry of scaling, twittering sandpipers.

Beyond the rice-fields were ground pea and Indian corn, and after hesitating a while in the dense tangle along the fences, the Junglefowl would gradually spread out and feed. This tangle was composed chiefly of small aromatic plants and the orange-flowered lantana. The cactus disappears before we reach these low, moist places.

Many of the Junglefowl spend the day in the shade of these tangles, and come out again in late afternoon. A few return when the sun gets high, to the cactus-guarded limestone caves on the ridges, to come down again in the evening for water and a short period of feeding. A few hungry youngsters may be found feeding out late in the morning in the hot sun, but evening is the time when all are visible. In a short walk across two fields, I disturbed thirteen, shooting three in the plumage which I wished to study.

Early in the morning, even before I had reached my place of concealment, I would find a shrike in the top of almost every conspicuous bush, while bulbuls babbled everywhere from the thickets. The shrill voices of little Java boys driving cattle and goats would reach me from the dusty road. One or two native roosters would crow in their lazy, blatant way, then, from half-way up the ridge, there would come the sharp, crisp, virile *Chaw-aw-awk!* of the Green Junglefowl, and I knew the splendid birds were on the move. The sun rises from behind a bank of cloud, and a half-dozen white herons fly past up the valley. Overhead, watchful above a green, unhealthy-looking pool, sits a little maroon kingfisher, perching motionless until the Junglefowl have passed with low clucks on their way to the tangles at the edges of the valley fields.

Such in general is the haunt of these wild fowl. But unless we knew to the contrary, we should never suspect a Junglefowl of inhabiting such a dreary, rocky waste. Having nothing to fear from the natives in the way of guns, and, at least in this part of the country, but seldom trapped, the birds were not unusually wary, and when they were feeding, one could, with but little woodcraft, approach to within range, whether of gun or of field-glasses. By locating their general range and making as thorough a canvass as possible on one morning, I learned that at least twenty-seven birds were living on or between the three limestone ridges nearest my headquarters. Besides which I had shot eight others. There was, then, a total of thirty-five Junglefowl which roosted or fed within considerably less than a square mile of territory, and probably many others escaped my rough census.

In September, these birds were in pairs or families, at least as regards their roosting habits. In the daytime, when many of them would drift down into the cultivated valley lands, there would at times be six or eight birds feeding close together, half of which might be adult. But when they separated, never more than a pair of old birds would go off together, either alone or with a following of well-grown young of the year.

I saw considerable evidence that the same individuals roosted in the same place each night, and worked over much the same ground during the daily feeding, and I am inclined to think that the home range of these birds on the coast is extremely limited. On the other hand, forest wardens, the only reliable natives with whom I came in contact, informed me that in the rainy season the number of Junglefowl was augmented by birds from the interior, which came down from the hills for some reason toward the coast, and retired at the beginning of the dry season. As even at the height of three thousand feet there would be no temperature change sufficient to account for this general shifting, we must credit it to a direct food stimulus, or a desire to escape from the excessive humidity of the hills at this time of the year.

Although the breeding season had scarcely begun, I found the cocks very voluble, crowing not only in early morning, but even when feeding, and in the presence of other adult cocks. These would sometimes crow *at* one another, the challenge and defiance ending, however, with the vocal outburst. Later, the affair would doubtless have entailed more serious results.

I was able to master the essentials of the wild fowl's vocabulary from my blind. The note of content, when lazily feeding, or when stretched out on their side flicking the dust over and through their wings, was a slowly uttered, drawn-out *wăk, wăk, wăk, wăk*. When several captive cocks were placed in their respective baskets close to one another, they would talk for an hour at a time, the tone being a most irritating, rasping drawl, which seemed never to cease, but as soon as one bird got out of breath, it was instantly taken up by a second, and so on *ad nauseum*. When suspicion of danger came to the wild birds, and the alarm brought them to full attention in readiness to escape, the note was the syllable *chop! chop! chop!* or *op! op!* uttered many times, sharply and in quick succession. When in this emotional state, the cocks held their head high, the position distending the brilliant throat wattle into a gorgeous sheet of colour. The tail was, at the same time, lowered, until the feathers fairly dragged on the ground. Another mood, apparently when the bird is certain of impending danger and all too willing to escape, but does not know from which quarter it threatens, is indicated by a series of disagreeable, shrill, metallic tones, drawn out like the content note of a domestic hen, but of the same timbre as the despairing wail of a captured fowl: *awk-awwwwk-aaaawwwk!* The note of utter despair when a bird is cornered and makes a final wild effort at escape, or when a captive bird is seized by the legs, is a long-drawn-out wail, almost peacock-like, louder and quite different in quality from the last call described, *au—waaaaak!* and uttered only once or twice, after which the bird is silent.

The notes of the female are somewhat different. The call-note, which is usually answered by other birds within hearing, sounds like *chak, chak, chak,* repeated slowly six to ten times. The call of suspicion or uneasy curiosity is a high, strident *ak-kak-kak-kak-kak-kak,* kept up at a rapid rate from ten seconds to half a minute. I was told by natives in widely-separated parts of Java, that the hen invariably made an outcry when she left her nest to feed—whether after laying an egg or not, I could not learn. This note was given me as *kōwak, kōwak, kōwak, kōkōwak,* and such was the general agreement, independently confirmed, that I am inclined to give it some credence; at least I present it for what it is worth.

The imitations of the crow of the wild cock, which were given me in various parts of Java, seemed to have run the gamut of the vocal utterances of all the island avifauna, from the hoarse croak of a cormorant to the scream of the peacock. The Sudanese name for the Junglefowl is onomatopoetic, spelled in many different ways, but most commonly Tjangehgar. To the natives the crow appears to sound something like *tjang-eh-wear.* This crow is three-syllabled, but with no decided break or stop as in that of the common fowl. It is a high, shrill, metallic vocal explosion, *chaw-au-áwk!* as well as I can write it. These syllables are the result of listening to, and recording on the spot, the crows of about a score of wild birds. Usually the notes are on one tone, sometimes an individual will slightly raise the last two syllables, or all three may form a gradually ascending scale, separated hardly by half tones.

When neither rival nor hen is in sight, the tail droops even more than usual, the body is held upright, the head stretched upward and forward, but with the wattle only slightly extended.

The Javan Junglefowl are strong on the wing, although, like the other species of the genus, they will not use these organs unless forced to, but trust to their swiftness of foot to take them out of any ordinary danger. Several times I have cornered one or more birds on a steep cliff and made them fly into the valley. They rise easily, beating rapidly at first and then descending in a long, scaling curve to the fields below. In the case of the birds which roosted on the islet off shore, there was a voluntary flight of seventy-five yards twice each twenty-four hours, over the shore and the water, sometimes against a stiff breeze, which made it necessary for the birds to beat very rapidly and continuously the entire distance.

The general carriage, of course, varies with the speed and the mood of the bird. The tail is held much lower than in the domestic cock; in the normal walking position, the long central feathers sweep the ground, drooping on each side, so as to hide completely the real tail-feathers. When running at full speed, the head and tail are almost in alignment, the latter streaming straight out behind. In crowing, the tail may be held fairly high or drooping, and when approaching a rival, or beginning to display before a hen, this organ is raised to the usual carriage in a domestic cock.

Even a slight lowering or raising of the head makes a remarkable difference in the general appearance, owing to the respective retraction or distension of the throat wattle. The comb is, of course, always displayed, but whereas usually only a bit of red skin is visible above the feathers of the neck, when the bird stands fully erect the blue and yellow areas of skin become very conspicuous, equalling the scarlet of the chin region in the brilliance of their hues.

DAILY ROUND OF LIFE

As in so many of the tropical pheasants, termites or white ants enter largely into the diet of Javan Junglefowl. Every dry and rotted stump on the slopes of the limestone ridges sheltered large numbers of these insects, a few pecks of the bird's beak being often enough to expose hundreds. Four birds examined as soon as shot, collected at different times and places, showed that they had been feeding as follows:—

A. Male, adult.—Fifty-two termites, 1 black ant, 1 small hemipterous insect, 6 seed cases of *Hyptis* sp., and many berries and leaves of the widespread *Lantana mixta*.

B. Male, adult.—Several hundred termites, 6 black ants, 1 mosquito, 2 small spiders, 1 green coleopterous grub, 15 seed pods of the ground pea, several hundred seeds of weeds, chiefly a harsh spiny grass, *Rottbadia* sp.

C. Male, juvenile.—Forty-eight termites, many leaves and small white flowers and several hundred seeds of weeds and grass (*Rottbadia*).

D. Female, adult. About 200 termites, 34 large black ants, 1 coccinellid beetle; the juice of cactus fruit, many good-sized pieces of tapioca root from the whittlings of a native woman in a field.

As in the coastal district of Ceylon, the flora of this part of Java was, in a sense, a false one, the *Hyptis* and the cacti, forming such dominant characters, being both introduced by mankind from South America. The aromatic character of both the *Hyptis* and *Lantana* not only scented the air when one pressed into a thicket and bruised some of the leaves, but was transferred to the flesh of some of the individual Junglefowls, adding a not unpleasant natural spice. An abundant source of food was the fruit of the cactus. The blossom of this imported plant was pale lemon yellow with a tinge of orange, but the succeeding fruit or "prickly pear" was stout and rose-red, containing a very juicy pulp of the same colour. I have shot more than one bird whose bill, forehead, nostrils and chin were stained red from the juice of this fruit.

Besides the above detailed examples I have found representatives of every principal order of insects in the crops of these birds, in addition to the remains of many marine or littoral creatures such as small crabs, shrimps and mollusks.

The roosting habits of the Junglefowl were of great interest, and I spent considerable time in tracing out the various places where the birds spent the night. I found three separate roosts on low branches in a mass of cacti and other thorny plants, where one or more birds sought safety from nocturnal enemies. Another bird, or perhaps a pair, as the sign seemed to indicate, roosted on a low, sweeping bamboo which had been bent far over, near the foot of a cliff, and partly shielded from above by a dense growth of grass which sprouted from its precarious hold in a niche of the cliff side.

I have already alluded to the strange introduction which I had to this bird, the sight of three—two cocks and a hen—flying straight to sea for some seventy-five yards to an isolated mangrove islet. It may be that this habit was the result of the birds being once driven off shore by some sudden danger at low tide. I noticed that in the case of both these and other individuals, much time was spent about the tidal pools search-for small organisms. At low tide half the distance to the island became bridged by bare coral reefs, so that if the birds first found their way to the mangrove islet at low tide they would have had much less distance to fly than when I saw them at sunset taking off from the very edge of the shore itself. It was the more remarkable that all three birds were young of the year, evidently of the same brood, whose wing-feathers were still in moult. This I ascertained by examination of one of the cocks. The other birds were not disturbed by the loss of their fellow, and continued to fly out as usual night after night.

The last roosting-place which I shall mention was almost equally striking and unexpected. I have already spoken of its location, an underground cavern near the summit of one of the limestone ridges. With the aid of an electric flash lantern I once made my way to this spot after nightfall, and dropping a bit of stone into it I awakened the inmates and heard the unmistakable voices of several Junglefowl, but could see nothing. One day, by means of much painful squeezing, I managed to enter the outer part of this cave, and by a most uncomfortable twisting upside down I could see into a still deeper portion. Here were several broad, sharp-angled ledges, and the feathers and sign beneath them showed that they must have been used for a long time. They were so isolated from the floor that nothing without wings could have reached them, and here the birds spent their nights in safety. Scores of tiny bats were hanging in festoons on the walls, so that the cavern afforded a shelter to wild creatures both by day and night. Judging from the number of Junglefowl which every afternoon made their way up the slopes of this ridge, there must have been at least a dozen which found nightly shelter somewhere near the summit. The only reasons, however, that I have for thinking that most of these may have roosted in the cave are, first that I was unable to find any other roosting-place on this entire ridge, and again judging by the abundance of feathers and sign in even the partial view which I could get of the interior of the cave.

The Junglefowl of the coast seemed to be peculiarly isolated. The other birds of this vicinity had nothing in common with them, and if they were seen anywhere in the neighbourhood of one another the association was of the most casual character. The natives, as I have said, bothered the birds in this region hardly at all and apparently knew but little of trapping. Their four-footed enemies are very numerous, and the mongoose, martens and snakes doubtless make life one great need for vigilance and watchfulness. Wild boars are said to do much damage in ferreting out the eggs and devouring them. It was doubtless the fear of such enemies that drove some of the Junglefowl near Patjiran to utilize such unusual roosting-places. It was rather significant that the forest guard near this place told me that it was in the rainy season that the small four-footed carnivora are most abundant and do most damage to poultry. This was also the season when the Junglefowl from the interior come toward the coastal lowlands.

I was not fortunate enough to obtain any insight into the actual tragedies of life of these birds. Often, however, while I was watching them through my glasses quietly feeding, a nearby rustle would send them fleeing headlong through the tangle, sometimes directly past my blind. Again, when the wind filled the air with rustling sound of leaves and bamboo stems, the birds would pay no attention whatever. I could never discover the author of any of the sounds which alarmed them so. Only when I myself came upon them suddenly, or pursued them to the edge of some small patch of cover did I see them take to wing to escape. At all other times their sturdy legs were trusted to carry them into safety. I never saw females or young birds in their native haunts squat to avoid observation. When confined in small native quakes or baskets, and alarmed at one's approach, the male, if a newly-caught bird, would invariably dash madly about and try to force his way out, while the newly captured females often squatted until one had approached quite closely, when they too fluttered wildly.

HOME LIFE

The breeding season varies considerably in the various portions of the bird's haunts, and even in one locality several months may intervene between the laying of neighbouring pairs. I believe that this and not a double brood explains the presence of chicks of various ages in any one place. It usually corresponds with some portion of the dry season, from June to November, more often in the first month or two of the East Monsoon, for then the abundance of insect life and the newly sprouting plant life is propitious for the rearing of the hungry young birds. In Patjiran the extremes of the breeding season must extend at least from June until November, judging by the ages of the young birds which I secured. In the interior they are reported to nest usually in June, and I believe this is correct.

The cocks are said to fight fiercely during the breeding season and assiduously to court their mates. Their method of courtship does not differ from that of the red junglefowl, except that the head is brought more prominently into display. They seem to be fully aware of the beauty of their comb and wattle, and when the cock is strutting before the hen and flattening himself obliquely toward her, the head is always stretched out and leaned well in her direction. At such times the wattle is stretched to the utmost, and temporarily the head of the bird appears merely a small median connection between the two great parti-coloured sheets of skin—the comb and wattle.

I have seen the Junglefowl only in pairs, and I have watched many of these day after day. Other observers report that the species is sometimes polygamous, a cock having as many as four hens in his harem.

The nest is usually a hollow in the ground hidden amongst dense vegetation of some kind. Several, however, have been authentically reported as being placed in the shelter of a clump of parasitic ferns growing at some height against the trunk of a tree, and again, more than one has been found in the heart of a tree-fern's top, surrounded by the curving fronds, with a lining of the soft red down from the stalks of the ferns.

The only nest which I found was one which had retained its traces from the preceding breeding season, preserved by the dryness of the air and the security of its location. I had made my way to a new ridge of limestone a mile or more inland, and with great difficulty had forced a path through briars and cacti to a sheltered wall of jagged rock, the whole surface of which was gutted and sculptured and whetted to razor edges by the wind and water. Close above a ledge, breast high, several large oak-leaf ferns were growing, strongly rooted to the face of the rock, and just beneath one, on the ledge itself, I found considerable old sign, weather-worn feathers in the deep crevices, and a number of pieces of dried egg-shell. Having satisfied myself that this was without doubt the remains of a Junglefowl's nest, I broke down several thorny plants in order to set up my tripod. A thousand bits of flame burned my flesh, and regardless of sharp rocks and cactus needles, I leaped down from the ledge covered with a host of fire ants. After I had freed myself from them I carefully approached, but an hour afterwards the whole ledge was still alive with them, and I had to content myself with a distant photograph. Thus was the nest of one Junglefowl protected from disturbance.

It is not an uncommon occurrence for tropical birds of many species to thus gain protection, although in this case the association may have been accidental. They themselves seem to be immune, unless some accident should occur such as the breaking of an egg, when the terrible ants, attracted by the contents, would probably force the bird to leave her nest. And woe to any young birds which happened to be touched by the broken yolk.

This species seems to deposit an unusually large number of eggs, six or twelve, with the node of average about eight. This is the consensus of statement of many foreign plantation owners whose facts in other departments of knowledge I have found to be quite reliable.

I know of no greater number of young seen with their parents than four, and several times I have observed what were apparently a brood of the year numbering only two. The voice of the chick does not differ from the plaintive peep of a domestic bird. The young remain with the old birds for at least six or seven months, feeding and roosting in close association with them. The number of times when I saw both parents with their broods leads one to suspect that monogamy is a more common habit than polygamy. Termites form the staple food of the very young birds—at least, this was true in the case of three nestlings which were sent to me in spirits for study.

From what I saw of the Javan Junglefowl in the small island of Madura, it differs in no particulars from the same species on the larger island. It is found only in the eastern part, and I found it to be especially abundant where there was much outcropping limestone, and less so where this gave place to earth and jungle. I saw a family of birds with an interesting history. A pair had been kept for several years in semi-captivity by the proprietor of a big, rambling hotel at Manding. They disappeared for a few weeks, and then returned to feed as usual on the scraps from the kitchen, accompanied by three young birds—another proof of monogamy.

The eggs are very rare in collections, and the published descriptions and measurements show such discrepancy that it is probable that the eggs of *Gallus gallus* or of hybrids have sometimes been confused with those of *varius*. Four eggs in my possession, taken near Patjiran, are buffy-white with a faint tinge of yellowish, of a rounded oval shape, the shell being glossy, with very inconspicuous punctures. They measure 43 × 34, 44 × 34, 45 × 35, and 46 × 35 mm., averaging 34·5 × 44·5.

RELATION TO MAN

The relation of the Javan Junglefowl to mankind is of a most peculiar character. The birds are of no direct economic importance. The contents of their crops show that on the whole they are more useful than injurious, feeding chiefly on noxious insects and the seeds of weeds, and taking but small toll from the grain-fields. The Javanese are a dull, lethargic race, and possess none of the interest in their surroundings which is exhibited by many other races of Eastern people. So that both in the coastal lowlands and in the mountains but little heed is paid to the wild fowl, the plantation owners alone shooting the birds now and then. There are no laws protecting them, but the fear of native uprisings has put such a high licence price both on bringing a gun into the country and carrying it when landed, that the Junglefowl have little to fear from powder and shot. One finds, here and there, captive birds carefully tended and often tamed. These, however, are exceptional. The great desiderata among the Javanese are hybrids between the wild Junglecock and a domestic hen.

In spite of reports which came to me frequently, I found no direct proof that the Javan Junglefowl, in a wild state, interbreeds with the native fowls. Even in captive birds this very seldom occurs, and several ingenious methods are resorted to in order to produce the greatly valued hybrids. In some cases the Junglecock is placed in a quake, or round beehive-shaped basket, from which the bottom is removable, and is then excited by the gradual approach, in a second basket, of a wild hen. To allow the two birds to mate would be quite useless, for the wild hen seldom or never lays in captivity. When the cages are close together and the cock is crowing and showing off his brilliance, exerting every effort to attract the attention of the female, she is suddenly replaced with a domestic hen, coloured as similarly as possible, and the cock is allowed access to her cage. Were this strategy not resorted to, he would have nothing to do with the domestic bird. Most of the inhabitants of the small Kangean islands seem to be engaged in this curious industry, and the numerous hybrids which one sees in all parts of Madura and Java come from these places. Hardly a house is to be seen which has not from two to six of these hybrids or *bekisars*, each in its separate basket, hung on branches in the compound or in the shelter of some outhouse. I secured evidence which seemed satisfactory that the Kangean islanders had been engaged in this hybrid-making for well over two hundred years. At present about fifty *bekisars* are exported to Madura and Java each month.

The more usual method of capture in Kangean is by means of a long, narrow net, which is suspended between the bushes of a hedge and a rice-field. The Junglefowl come down in late afternoon and pass by certain favourite openings through the bushes into the fields. Just before dusk the hinder side of the net is lowered to the ground, and then several natives rush with cries and much beating of sticks through the fields. This frightens the birds, which never rise if they can avoid doing so, but with lowered heads run swiftly for the shelter of the bushes. Well knowing that their only safety lies in this direction, they strive to push on even after they encounter the net. When well entangled the front of the net is dropped and the birds are caught.

The usual food of both wild birds and hybrids in captivity is bananas and unhulled rice, while cooked rice is now and then given as a special delicacy.

The *raison d'être* for these hybrids and their subsequent history is as interesting as their origin. Whatever characters of pattern and pigment are dominant or recessive, that of the voice is decidedly in the former class. I do not recall hearing any wild bird of equal size, unless it be the chachalaca in Mexico, which excels these hybrids in vocal power. They are able to give utterance to a sound, a scream, which must carry for nearly a mile. There is no cadence, no rhythm, no pleasing quality whatever. It is simply a blatant utterance, as strange as the idea of a hybrid itself must always be to us. Some excel others in power and endurance, and there is likewise a great variety in colours, due to the inherent strain of the mother. It is difficult to think that even the Javanese, with their ideas of music, so unlike our own, can derive pleasure from this sound, but be that as it may, they find its quality and continuity, characters well adapted for gambling upon, and prize fowls are matched with as great interest and excitement

HYBRID JAVAN JUNGLEFOWL

The wild Junglefowl do not interbreed with the native poultry, but in captivity the two species will occasionally cross. Some of these hybrids are huge creatures, with enormous pendant combs, and beautiful plumage; others are small and bantam-like with absurdly short legs. They are great favourites with the Javanese, who keep them on triangle perches or in ingeniously woven quakes or cages. The dominant character of these birds is the voice, which lacks cadence or definiteness, but consists of a scream which must carry for at least a mile. This is the stimulus to much betting, and owners of powerful-lunged birds often make large wagers on the vocal powers of the rivals.

HYBRID JAVAN JUNGLEFOWL.

as are fighting cocks in other countries. The hen hybrids are killed, as they are of no value, but the cock birds when full grown are placed in quakes and are peddled in all the Javanese towns, a basket on either end of a pole balanced over the owner's shoulders. Thus they are hawked about. The common kind—common in possessing no especially favoured type of plumage and only a mediocre crow, are sold for six or ten guldens. Pure white birds with better (or worse!) voices bring fifteen, while for a black bird of equal vocal ability thirty guldens are asked. Bekisars which have the head, comb and wattle like the *ajam oelas* or Javan Junglefowl, and the remainder of the plumage of the normal bekisar type, are very rare, and are known as *ratuña*. One in Madura, just brought from Kangean, was offered me for seventy-five guldens. A gulden is equal to 40 cents. or 1*s*. 8*d*. Connoisseurs recognize and appreciate fine points which mean nothing to an outsider, and I heard of a native chief who paid as much as two hundred guldens for a greatly prized bird, while there is a record of six hundred guldens paid for two birds, jet-black as to plumage, comb, face, wattles, legs, feet, and even iris, with very strong voices.

A poor native who possesses a hybrid must content himself with keeping it near or in his house in its quake, and there listening to its constant outcries, or matching it and backing it against the vaunted crowing of some neighbour's fowl. But the native chiefs make the most of their high-priced bird's vocal ability.

In Soemanep, Madura, the last independent sultan died in 1885. His son has been made Regent under the Dutch authority, and this prince, whose name is Roden Ario Manahoe-Hoesoemo, is a connoisseur of hybrids or bekisars. He told me that the character most valued in the crowing of these birds is the loudness and the piercing quality; the crow must also be long-drawn-out and monosyllabic.

A special apparatus is used to induce these birds to exercise their lungs. This consists of a very tall bamboo, which is erected in the compound, with a primitive sort of pulley as near the top as possible. The bekisar in its basket is attached to the end of a rope and pulled up to the pulley high in air, where it remains during the day, crowing lustily hour after hour. The prince had a prize bird pulled up for my benefit, and the bird began its crowing while the cage was whirling around on its jerky ascent. A village sometimes presents a curious aspect, and the visitor is startled by the sight of the baskets suspended to scores of swaying bamboos, while one's ears are assailed throughout the day by the terrible raucous outcries from mid-air. This loud and penetrating crowing, while primarily valued for the means of gambling, is supposed to bring good luck to the house over which the vibrations pass. The wild Javan Junglefowl are not admired, because their crow, while of the correct timbre, is very faint compared with the lusty cries of the big hybrids.

I learned through interpreters, that among the poorer classes another standard of vocal excellence is rife; where birds with a short, abrupt crow, more like that of the wild Javan bird, but with a persistence which would drive a white person insane, are valued over other individuals. In a smaller number of cases I found that birds with voices of indifferent power and persistence were kept solely for the beauty of their plumage, as indeed, in this respect, they far excel any breed of native poultry.

The hybrids soon become tame, and are allowed to run freely about among the domestic poultry. The plumage of these hybrids is so unlike the colours and patterns of either of the parent species that individuals which found their way to Europe in former years were considered to be distinct species. Thus we find such synonyms as *Gallus temminckii* Gray; *G. æneus* Cuvier; and *G. violaceus* Kelsall. The most striking character is the metallic gloss of the upper plumage, fringed with golden yellow. Even in the pure white birds this iridescent fringe persists, and is wonderfully beautiful in the sunlight.

As regards the fertility of the hybrids, our ideas would be chaos if we had to depend upon the statements of the Javanese. Throughout the west of the island one hears everywhere not only that the bekisars are sterile, but that they will not survive a single mating with a domestic hen. In the east such ideas are laughed at, and the birds are said to cross readily. I have proved the truth of the latter theory to my own satisfaction, and have bred many kekoks, as they are called. On the other hand, this second generation in Madura is known to many natives as *bekikkos*, which name in Java is applied in the west to the Red and in the East to the Javan Junglefowl. Such is the confusion of names, coupled, as I have said, with widespread ignorance of the occurrence, appearance or habits of the wild birds. This second generation of cocks, between the bekisars and domestic hens, reverts to the red junglefowl type of plumage, or at least loses much of the green and violet iridescence of the upper plumage, while retaining the large size of the bekisars. I shall have more to say about this farther on.

As we have seen, the Javan Junglefowl bears captivity remarkably well in its native islands. Wild as the cocks naturally are, they are susceptible of taming to such an extent that they may be taken out of their baskets and handled without showing any signs of fear. The aberrant general character of this species makes it certain that this is merely an incidental characteristic of the bird, and has nothing to do with the tameness of domestic poultry. No one, I think, has seriously considered the Javan bird as sharing in the direct ancestry of our breeds of fowls.

These birds are not common in zoological gardens, but sailors occasionally bring cock birds to Europe and America. Of eleven Javan Junglefowl which have been kept in the London Zoo, one lived for five years and two months, while the average length of life was about two years.

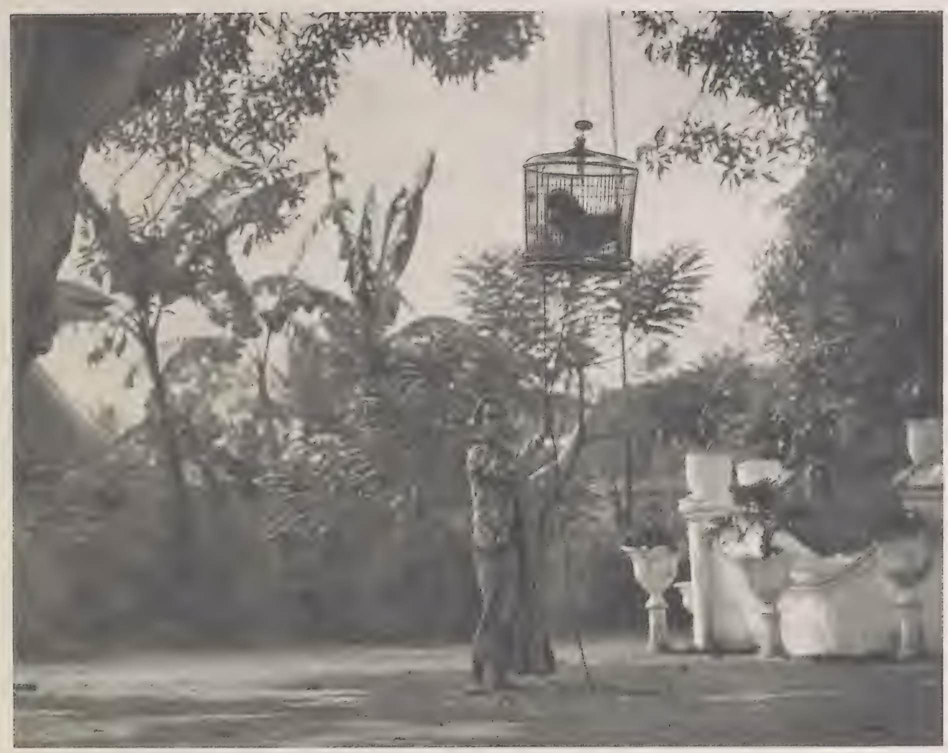
The difficulty with which hybrids are produced in Java diminishes under other conditions. In the New York Zoological Park adult Javan Junglefowl cocks have mated readily with bantam hens, and as many as five out of a clutch of six eggs have proved fertile and the chicks reared to maturity.

DETAILED DESCRIPTION

Adult Male.—Comb, face, wattle and fore-neck bare of feathers. Ear-coverts dull brown; top of head, back and sides of neck and upper part of the mantle, corresponding to the elongated hackles of other junglefowl, composed of short and square-tipped feathers, with the visible portion raised into a convex transverse band, the vane itself being thus moulded into a rounded terminal ridge. This is exactly similar to the corresponding structure in the feathers of *Lophura* and *Lobiophasis*. The base of the feathers is dull brownish black, part of this zone showing when the feathers lie naturally. Just before the distal curved section, the black shows a very faint violet gloss, then

HYBRID JAVAN JUNGLEFOWL IN ITS AERIAL BAMBOO CAGE

The hybrid Junglefowl are sometimes valued as high as six hundred gulden. The chiefs and wealthy natives erect a very tall bamboo pole in the compound with a primitive sort of pulley near the top. The fowl in its basket is attached to a rope and pulled up, high above all the surrounding trees, to remain throughout the day, sending forth at frequent intervals its loud, piercing scream. It begins its call even while the basket is whirling around on its jerky ascent.



HYBRID JAVAN JUNGLEFOWL IN ITS AERIAL BAMBOO CAGE.

suddenly becomes a brilliant purplish-blue. The convex band itself is a rich, glowing, greenish bronze, the feather terminating in a very narrow fringe of black. These colours are wholly absent from the under surface, and, of course, from their character, disappear when viewed by transmitted light.

On the mid-mantle the purplish-blue becomes so extreme that it replaces the proximal black in the visible portion of the feathers. The lower mantle changes rather abruptly, the feathers losing their truncate character and becoming rather obtusely pointed. Simultaneously the curved ridge becomes obsolete and the black fringe increases. The purplish-blue disappears and the whole of the visible feather is uniformly golden green. Just basal to the black fringe the vane is sometimes tinged with bronze. The lower back and rump form another abrupt colour area, with almost no transition pterylum. The feathers are narrow and greatly elongated, finger-like, with rounded ends, and in colour dead black, with a conspicuous fringe all around of golden yellow. The shorter upper tail-coverts are similar, but with a large central area of bluish green. In the longer feathers of this series the fringe becomes obsolete and the green gloss dominates the whole feather. The lesser and median wing-coverts are much like the back feathers in shape, hackle-like, but the disintegrated fringe is longer and of a rich, deep, reddish orange. On the inner greater coverts this pales to the golden yellow of the back hackles. Greater coverts and secondaries black, more or less glossed with bluish green. Primaries dull blackish brown. Tail-feathers black, glossed with greenish blue, especially on the outer webs. Entire under parts dead black; under tail-coverts slightly fringed with yellowish buff.

This Junglefowl has the long, curved, central tail-feathers, but lacks the elongated flowing neck hackles of the other species. Its most striking secondary sexual character is the pigmentation of the comb and wattle. The former is very large, with the upper margin entire, and no traces of the deep notches of the other species. That is, the usual comb is thus entire, but perhaps ten per cent. of the cocks show very faint serrations on the posterior half. In one wild shot bird, for instance, I found, on close examination, five well-marked teeth, one of which was double-notched, all near the posterior upper angle. In three females I have observed minute serrations along the summit of the rudimentary comb. The size of the comb often results in its leaning far over to one side, especially at other than the breeding season. The central basal part is greenish or greenish blue, this colour changing abruptly into a violet red, which extends over the whole remaining four-fifths of the comb. In some individuals this is almost clear deep red; again the violet, peach-bloom sheen may cover almost all of it. The rim is usually pure blood red. The lower eyelid is dull violet in the centre, changing into pale yellow around the edge. When the eye is open this colouring is invisible, but when drawn up over the eye, the lid stands out clearly against the facial red.

The whole unfeathered part of the crown, lores, the face to the edge of the feathering all around, including the small, sub-auricular wattles, chin, throat and anterior two-thirds of the median, throat wattle, deep blood red. The wattle begins well up between the lower mandibular rami and extends far down on the neck, hanging downward as a large median fold of skin. In fully adult birds at the breeding season this may be two and a half inches in length. The free ends of the feathers of the neck, truncated though they are, reach cape-like over the bare throat, and when the head of the bird is drawn down the wattle is almost completely hidden except for a portion of the anterior red. When courting or preparing to fight, or when the head is stretched out for any reason, the full glory of pigmentation of the wattle excels even that of the comb. Beginning at the lowest fold of the small facial, sub-auricular wattles, a band of intensely brilliant chrome yellow extends downward, gradually widening, to beyond the attached end of the wattle and almost to the posterior free end. The remainder of this organ, the lower outer portion, is a rich azure blue, sometimes with a hint of greenish. The relation of the three colours to one another is interesting, and also the character of the skin itself in the respective zones of pigmentation. The yellow is abruptly marked off from the other two colours, while the red and the blue show a considerable area of gradual transition, a violet which appears darker than either colour. The yellow area is the most folded and creased, the lines being transverse, longitudinal and diagonal, forming a complex network. The red hardly shows its rather longitudinal wrinkling, while the blue is conspicuously marked with dark wrinkles running at right angles to the edge of the wattle. In fully adult birds the face and entire wattle are free of feathering, the last traces being a small patch of black featherlets on the throat and wattle in the red area close to the yellow.

Iris lemon, orange or pale straw yellow. Mandibles usually pale horn-colour. The base of the upper mandible may be black or dark reddish and the whole under mandible yellowish or ivory horn. Legs and feet varying from fleshy pink in the breeding season, to quite pale whitish. Or the posterior half of the tarsus, the toes and the spurs may be dark brown.

Length, 700 mm.; bill from nostril, 16; wing, 225; tail, 325; tarsus, 73; middle toe and claw, 60; spurs, slender and curved, about 25 mm. in length. Weight, 1 lb. 12 ozs.

Adult Female.—Top of the head, neck and upper mantle sandy brown, the latter feathers with a wide, black, sub-marginal, concentric band, enclosing an area of rather rufous tone. The remaining upper plumage and the smaller coverts are black with buff edges and an irregular transverse band of rufous buff, many of the feathers with a hair-like, white shaft-streak. Much of the black, especially on the scapulars and wing-coverts, is glossed with iridescent green. Secondaries brownish black, barred on the outer webs with buffy white. Primaries and alula plain dull brown. Tail-feathers brownish black, with a few irregular marginal spots of buff, separated with dark areas indistinctly glossed with greenish.

Lores, broad superciliary stripes and the rather scanty feathering on the sides of the face pale buff; chin and throat white. Ventral plumage brownish buff, the breast feathers margined with dark brown, and the feathers in general sparsely and irregularly mottled with the same colour, especially on the sides and flanks, where the dark colour forms irregular bars.

Iris pale straw yellow. Skin of the face as showing through the sparse feathering, and the small comb reddish pink. Throat fully feathered, but a low, permanent fold of skin represents the wattle of the adult cock. Legs pale flesh colour.

Length, 400 mm.; bill from nostril, 15; wing, 195; tail, 115; tarsus, 58; middle toe and claw, 48; spurs rudimentary. Weight, 1 lb. to 1 lb. 4 ozs.

CHICK IN DOWN.—Upper parts from crown to tail, and the wing down, dark chocolate-brown; head, side neck and breast, brownish; line from lores through eye and ear-coverts back to the nape chocolate or black. A creamy buff line on either side of the dorsal brown along the sides and rump, bounded outside by a black line. Under parts creamy white. Iris pale hazel. Bill, legs and feet pinkish white or light horn colour.

The difficulties under which one has to work in the study of such an important member of the Javan fauna as the Junglefowl, even in its native land, is well shown by the specimens in the Buitenzorg Museum. There were six males all told, very badly mounted, two adult birds, one nearly so, and three immature cocks. No females, chicks, or birds in juvenile plumage. Of the three young birds of equal age, one had yellow glass eyes, another jet-black beads, and the third rich hazel irides. The combs were enclosed or replaced with thin wooden pointed sheaths. If such diversity, due to lack of definite observation, exists here in the very haunts of this insular species, we, thirteen thousand miles away, can readily understand the total lack of accurate details up to the present time.

JUVENILE PLUMAGE.—The sexes in this plumage are almost indistinguishable, judging from the small series I was able to collect. The cocks are more heavily pigmented with black, the general type of pattern and colouring being, however, much like the adult female. The feathering on the face is already scanty, and, together with the chin and throat, is pure white. The feathers of the top of the head, neck, and upper mantle are all normally rounded in shape, and in colour predominantly black, with a rufous-buff fringe and a narrow shaft-stripe. On the lower mantle, back, and rump this shaft-stripe widens and becomes a conspicuous buffy-white.

The lesser coverts are like the upper mantle, and the median like the back with the addition of a broad, transverse band and wide tip of buff or whitish. The secondaries and their coverts are banded or spotted with whitish and rufous on the outer webs, as in the adult female. The primaries are plain brown. The tail-feathers are dark-brown, irregularly barred or edged with buff.

The white feathers of the throat extend well down on the neck in a V-shape, covering the area which in the adult is bare and occupied by the median wattle. The ventral plumage is reddish-brown, mottled and spotted with black. On the flanks are found faint traces of the sub-terminal concentric band which characterizes the adult female. The under tail-coverts are black, with a fringe of buff.

The iris is pale hazel, and the spurs and comb are rudimentary. The facial skin as seen through the feathering is flesh colour, and the legs and feet are pinkish.

FIRST ANNUAL OR POST-JUVENILE MOULT.—In all the specimens which I have seen, this moult leaves the bird in a very imperfectly adult plumage, and it is probable that not until the second annual moult does the Javan Junglefowl ever come into its fully adult dress.

The typical change is as follows, although no two specimens are exactly alike, and indeed this is the most variable period of the bird's life as regards its external characters. The brown head, neck, and mantle feathers are replaced with black ones, with a slight green gloss near the tip, the fringe, however, retaining its rufous-brown colour. The convexity is hardly apparent, and the shape is less truncate than in the adults. The new upper-mantle plumage has only a faint gloss of green, this appearing first as two subterminal foci or eyes in the centre of the webs. The hackles of the rump are transitional between the juvenile and adult, broad, with stubby, tapering extremities and a very wide disintegrated fringe of pale yellow. The black centre is often mottled with buff and brown. The coverts are even less advanced, and in place of the orange red, show only a faint rusty-yellow fringe. The upper tail-coverts are all bordered with yellow-buff, and very imperfectly glossed with green. The tail-feathers have buff edgings, and the secondaries a series of large, reddish-buff spots on the outer web, the whitish bars and spots having been eliminated. The new ventral plumage shows a diminishing of the red-brown, and a corresponding increase of black.

This is the more usual style of moulting, where a gradual transition carries the bird only part way to the final colouring and patterning. A week one way or the other would doubtless make considerable difference in the retention or elimination of juvenile characters. In fact, we have absolute proof of this in the secondaries taken as a whole in a moulting bird of this age. The sequence of moult being from the outer to the inner feathers, the new outer feathers are well marked with juvenile characters, while as we proceed inward, the adult colours become more and more pronounced, the manufacture of the immature buffy giving way to the melanism of the adult.

Now and then, in fact in about twenty-five per cent. of the young cocks which I have seen, a very interesting condition is found, usually confined to the tail and its coverts, never occurring on the wings, but occasionally on the body plumage. The change from youth to adult is sudden: twenty-four hours at most sees all the pigmentation altered, all the imperfect patterning of the juvenile repressed and succeeded at once by perfect gloss and specialized shape of the adult cock's plumage. Widespread as this appears to be, it is assuredly abnormal, for the plumage suffers, and the majority of the feathers soon break at the point of demarcation. In such a bird, some of the side coverts may be of very recent growth, and hence adult in colour; other old lateral coverts are as completely juvenile, but the recently sprouted feathers will have been caught half-way. The terminal half of each feather is the purely juvenile, or feminine, mottled brown. Then comes an abrupt change, and without transition appears the adult condition, in width, curvature, colour and size of shaft and web, strong metallic gloss and all. The sudden increase in the weight of the feather and the diameter of the shaft has resulted in a top-heavy weakness, and all but one of the feathers affected have broken off, the break occurring in the shaft, and not in the barbs. The point of chief interest in this is not the details of the phenomenon itself, as it is clearly abnormal, but the possibility, as shown by the twenty-four-hour growth of the webs, of the entire secretion of the bird's pigment changing within so short a space of time.

Abnormal though it is, this condition is at least understandable, but in two of the birds in the Buitenzorg Museum, and in several which I have shot, a state of affairs still more remarkable is found. The sequence is reversed. That is, the terminal portion of the feather, which of course first grew out, is altogether adult, black, and iridescent green, while the last two-thirds to appear are quite juvenile. Here the adult pigmentation must have come into action and then abruptly, within the space of a day, have ceased or been turned into another channel, while the juvenile colours again flowed and functioned.

In following the development from chick to adult, confining ourselves always to corresponding centres of plumage, we find two paths of pigment evolution: first, sandy-brown, red-brown, dark-brown, black, and iridescent green; and second, whitish-buff, pale straw, yellowish, orange-yellow, orange and deep orange-red. This is well illustrated by the inner secondaries, which, in the retention of juvenile characters (permanently in the female, and longer than any other area in the developing cock) are the most generalized feathers of the plumage. They are mottled and barred with sandy-brown and whitish-buff. If we proceed from them mantlewards, we find them leading through feathers with more and more black until this culminates in the extreme of green iridescence. Covertwards, the pale edges increase and change through the yellows to a rich orange-red.

HYBRIDS

I have given what data I could in regard to the origin and uses of the bekisars or hybrid cocks between the wild Junglecock and domestic hen. In coloration there are two general types, derived through the mother from the red and the cream-coloured Malay game. These two colours are always most apparent and the last to disappear on the wing-coverts. The extreme of the red type is where the violet and green iridescence have spread over the body until they almost or quite obliterate all other pigments. I secured a young cock in which the red is reduced to narrow fringes on the coverts and rump. The bill, face, feet, and legs, and most of the comb and wattle are jet black.

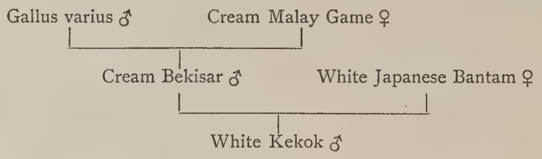
The extreme of the cream type is pure white throughout. I have a poor specimen, which is whitish in general, with golden-yellow fringe on the hackles, but dirty cream on the coverts and back, with the wings and tail part white, part metallic green.

The neck hackles of the first generation hybrids are much like those of *varius*, but with narrow margins of buff or red. The sub-auricular flaps or wattles are often of large size. The green area on the comb is usually replaced with the red, and the yellow on the wattle with bluish white. In pure white birds this area may be sulphur-yellow. The irides of all are pale, but orange instead of yellow. The shape and colour of the comb are like those of the domestic cock, while the median wattle is as in *varius*. After death, however, the basal part of the comb, which is greenish in *varius*, at once turns fleshy white, while the remainder holds its deep red hue for many days before slightly fading. Occasionally a bird will be found with both comb and wattle as in *varius*, and exaggerated both in size and colour. The rarity of such types of birds is attested by the high price at which they are held.

The general character of the crow and the power of flight are both like those in the wild fowl. In general size the hybrids excel both parents.

The second generation are known in many places as *kekoks*. This is probably a contraction of *bekikko*, a name which in Western Java is given to the wild red junglefowl. The aptness is apparent when we see that in the majority of these kekoks the plumage reverts to the *gallus* type. The hackles become long and lose much or all of the violet. While the median wattle may be well developed in life, its two dermal walls are attached so loosely that after death it splits, and the throat shows merely a wrinkled skin, with no hint of the wattle, owing to the non-adhesion of the two walls.

The crow in this generation usually returns to the three- or four-syllabled call of the domestic rooster. I was given a small, white kekok whose pedigree was:



This bird was especially interesting as regards its wattles and its crow. Across the front of its chin and neck was a flap of skin on which were strung five structures, the median wattle, outside of which were two larger gular wattles, while near the outer ends of the flap were the well-developed sub-auricular wattles. The crow was quite like the challenge of the wild Javan bird—an abrupt three-syllabled call, but at the end the beak of the bird remained open, and it strained ludicrously forward in a final silent exhalation, as if giving a long-drawn-out finale to the last syllable. Its audible crow was that of *varius;* the duration of posture and effort was clearly that of *gallus!* The kekoks cannot be classified, and some individuals which I have seen vary even assymetrically, having parti-coloured adventitious feathers cropping out here and there.

SYNONYMS BASED ON BEKISARS

Gallus aeneus Cuvier, is one of the types with violet upper plumage, margined with golden yellow; comb with minute teeth; a small median wattle.

Gallus temminckii Gray, is a red phase of hybrid. All the plumage margined with golden chestnut; six coarse teeth in comb; well-developed median throat wattle, and small gular wattles.

Gallus violaceus Kelsall, has the violet gloss dominant; a toothed comb, a good-sized median wattle.

EARLY HISTORY

The début of this bird in ornithological literature occurs in the form of a weirdly coloured plate given by Shaw and Nodder in their "Naturalist's Miscellany" of early but unknown date. The general characters are correct, however, and the entire comb and median wattle leave no doubt as to the identification. They call it *Phasianus varius* or variegated pheasant, and describe it as a "black pheasant, with red front, glossy-green neck and back, and compressed ascending tail with the coverts hanging down on each side." Aside from a more detailed but no more correct description, we are told that "this beautiful bird seems to be a nondescript, of which the present figure is the first that has been presented to the public. . . . The native country of this species is perhaps not clearly ascertained, but it is probably an Indian bird."

Temminck in his *Histoire Naturelle Générale des Pigeons et des Gallinacés* in 1813 gives us the first authentic note. "*Cette belle espèce est très abondante dans les grandes* *forêts de l'intérieur de l'île de Java, elle se tient communément pendant le jour à la lisière des bois; son naturel est farouche, attentif à se cacher au moindre indice de danger, il est difficile de l'approcher pour la tuer.*" And up to the present we have known but little more concerning the habits of this bird.

SYNONYMY

Phasianus varius Shaw and Nodd, Nat. Misc., X., pl. 353 [text].

Gallus varius Griff. ed. Cuv., III. 1829, p. 21; Lesson, Traité d'Orn., 1831, p. 492; Gray, List of Birds, Pt. III., Gall., 1844, p. 27; id. Gen. B., III. 1845, p. 499; Sclater, List of Phas., 1863, p. 10; Blyth, Ibis, 1867, pp. 307, 308; Gray, List Gallinae Brit. Mus., 1867, p. 40; id. Hand-list of Birds, II. 1870, p. 261; Elliot, Mon. Phas., II. 1872, pl. 35; Kelham, Ibis, 1881, p. 3 [Singapore?]; Hume, Stray Feathers, X. 1887, p. 68 [Johore, Malay Pen.]; Grant, Cat. Birds Brit. Mus., XXII. 1893, p. 352; Vorderman, Bijtrage tot de kennis der Vogels Kangean-Orde, 1893, p. 204 [production of hybrids]; Hartert, Novitates Zoologicae, 1896, p. 554 [Bali, 2000 feet]; Hartert, Novitates Zoologicae, 1896, p. 574 [Sambawa, up to 3000 feet]; Hartert, Novitates Zoologicae, 1896, p. 598 [Lombok]; Grant, Hand-book Game-birds, II. 1897, p. 59; Sharpe, Hand-list of Birds, I., p. 39; Hartert, Novitates Zoologicae, 1898, p. 49 [South Flores]; Hartert, Novitates Zoologicae, 1898, p. 465 [Alor]; Hartert, Novitates Zoologicae, 1898, p. 476 [Sumba]; Vorderman, Java-Vogels, II. 1898, No. 119; Nehrkorn, Katalog Eiersammlung, 1899, p. 194; Hartert, Novitates Zoologicae, 1902, p. 421 [Kangean Is.]; Ghigi, Mon. Zool. Ital., XIV. 1903, p. 319 [generic character]; Koningsberger, De Vogels van Java, II. 1909, p. 42; van Oort, Notes Leyden Mus., XXXII. 1910, p. 111; Mitchell, Proc. Zool. Soc., 1911, p. 522 [viability in captivity]; Vorderman, Nat. Tijds. Ned. Ind., XLIV., p. 231 [description of female]; Vorderman, Nat. Tijds. Ned. Ind., LII., p. 204 [hybridization]; Vorderman, Nat. Tijds. Ned. Ind., LIX., p. 225 [description of male].

Gallus furcatus Temminck, Pig. et Gall., II. 1813, p. 261; III. 1815, p. 662; Steph. in Shaw's Gen. Zool., XI. 1819, p. 215; Vieillot, Tabl. Encycl. Méth., I. 1823, p. 364; Temminck, Pl. Col., V. 1829, pl. 4 [No. 483]; Gray, Ill. Ind. Zool., I. 1830–32, pl. 43, fig. 2; Schinz, Nat. Abbild. Vög., 1833, p. 242; Jard, Nat. Lib. Orn., IV. 1834, p. 184, pl. X.; Schinz, Nat. Vög., 1853, p. 145; Bernstein, Jour. für Orn., 1861, p. 188 [habits and nesting]; Wallace, Proc. Zool. Soc., 1863, p. 486 [Lombock, Flores]; Finsch, Notes Leyden Mus., XXII. 1901, p. 302.

Creagrius varius Gloger, Hand-u. Hilfsb., 1842, p. 387; Ghigi, Mon. Zool. Ital., XIV. 1903, p. 322 [generic characters].

Gallus javanicus Horsfield, Trans. Linn. Soc., XIII. 1822, p. 185 [Java].

Gallus violaceus Kelsall, Jour. Straits Asiatic Soc., XXIV. 1891, p. 167; Kelsall, Jour. Straits Asiatic Soc., XXV. 1894, p. 173.

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